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ABSTRACT

This publication was designed to help teachers learn about promising materials, methods, and techniques for teaching creative thinking and problem solving to disadvantaged elementary school children. Two kinds of reviews of published teaching materials for specific grade levels and subject areas are included: (1) reviews of commercially published materials dealing with creativity and problem solving and (2) reviews of books that can be used, as teaching aids and/or stimulus materials. In addition, information about teaching methods which can be adapted by the teacher to fit any grade level and subject area is presented. Detailed tasks, exercises, and procedures for teaching creativity and problem solving in the classroom are included. Most of the materials reviewed in this publication will work well in open and individualized classrooms; however, teachers who maintain a more traditional classroom organization will find that many of the materials and methods can be adapted to meet their needs. (Author/AM)

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Teachers Edition

TEACHING CHILDREN HOW TO THINK

Synthesis, Interpretation and Evaluation
of Research and Development on
Creative Problem Solving

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EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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FINAL REPORT

Synthesis, Interpretation and Evaluation of Research and Development on Creative Problem Solving for Elementary Teachers of Disadvantaged Children

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Chapter 1

Teaching Children to Think

Introduction

The purpose of this book is to help teachers teach children how to think and especially how to think creatively. Much time in the classroom is spent teaching information and basic skills in reading and mathematics. Very little is used to teach children how to use information and basic skills in thinking, solving problems, or creating new ideas.

Creative thinking is the ability to think of a lot of ideas where there is a problem or a need for ideas. It is also being able to think of many different ideas, being able to think of unique or original ideas, and being able to develop or elaborate ideas. Sometimes it is being able to ask good questions which clarify a problem. It is also being able to translate ideas into forms of communication or expression which make it possible for other people to grasp our ideas or solution to problems. Thus, we must be able to find words or use art media, music, drama, or movement to express our ideas, solutions, or feelings.

In an increasingly complex, ever changing, challenging and problem-ridden world, people of all ages have great need to be good creative thinkers and good problem solvers. However, our greatest hope for improving thinking lies with children in school. It is easier to arrange the conditions in school to help children learn how to think than to try to change adults, most of whom are no longer involved in formal education.

Children from some economically disadvantaged and low-income minority families are more likely than middle class children to face serious problems in many aspects of their lives. Thus they have a special need to become good thinkers, good problem solvers.

This book is directed especially to teachers of children from some economically disadvantaged and low-income minority families, but it is likely that all teachers will find the information useful in improving their teaching of thinking, creative thinking, problem solving, critical thinking, and inquiry.

An attempt was made to assemble and evaluate a large amount of information about teaching materials and methods, especially for teaching creative thinking and problem solving. However, it was found that such materials are often closely related to the teaching topics of inquiry and critical thinking. Therefore, these topics are dealt with in reviews whenever some aspect of creativity or problem solving was identified as a part of critical thinking, inquiry, etc.

It was also recognized very early in the project that most of the time in typical classrooms is devoted to the usual curricular or subject matter areas such as social studies, language arts and reading, science and mathematics. Thus, it was decided that it might be best to give teachers information on how to teach thinking within regular subjects as much as possible.

Finally, it was recognized that a lot of guidance and direction from teachers on the job would be needed. Thus nearly one hundred teachers in Atlanta, Kansas City, Indianapolis, and Los Angeles were interviewed. In addition, questionnaires were given to hundreds of other teachers in grades kindergarten to six. Thus, a great deal was learned about teachers' needs, problems and concerns in trying to teach children to think.

An Overview of This Book

Chapter Two discusses the purposes, objectives, and rationale of this investigation. It is designed to provide an overview of problems and approaches in teaching disadvantaged children and in teaching creativity and problem solving in general. A theoretical conception of problem solving is also presented.

Chapter Three contains descriptions of published teaching material for specific grade levels and subject areas. It is divided into two main sections. The first section includes reviews of commercially published materials dealing with creativity and problem solving. The second section includes reviews of books that can be used, either through the suggestions that they give on methods of teaching creative thinking or problem solving, or by actually using them as stimulus materials. The best way to use Chapter Three is as a reference source to familiarize yourself with the great variety of materials that are available. In this way you will be better able to choose materials to fit your specific needs.

Chapter Four presents information about teaching methods or techniques which can be readily adapted by the teacher to fit any grade level and subject area. Nothing need be purchased. These are methods and techniques for teaching creative thinking, problem solving, inquiry etc. Often no special materials are needed. No AV equipment is needed. However, it will usually be necessary to adapt the technique to fit a particular grade level or subject matter.

Chapter Five provides more specific directions on how to get a project started in the classroom. It gives detailed directions for creativity and problem solving tasks and exercises and procedures for implementing them in the classroom.

Summary

The purpose of this book is to help teachers learn about promising materials, methods and techniques for teaching creative thinking and problem solving in their classrooms. In many schools teachers are developing broad new methods for open and individualized instruction. Most of the material reviewed in this book for teaching creative thinking and problem solving will work well in open and individualized classrooms. Creative thinking and problem solving are intensely personal and individual experiences which thrive in an open classroom climate. However, teachers who maintain a more traditional classroom organization will also find that many of the materials and methods are adaptable to their needs

and organization. A wealth of good ideas and good materials is available for teachers who are industrious, intelligent, creative, and motivated to apply them in their classrooms.

Chapter 2

The Project Rationale

Introduction

There is an urgent need to improve instruction in creative problem solving for disadvantaged children. The many social and political problems which face our nation will best be solved by citizens who have become good thinkers. Creative problem solving is the major and essential ingredient of effective thinking. The purpose of this project was to review research and development on promising methods, programs or sets of instructional materials for teaching creative problem solving to disadvantaged children. The report is designed chiefly for teachers and principals of elementary and junior high disadvantaged youngsters. In addition to complete information about the material there are also suggestions to teachers to guide them in developing new creative problem solving activities as demonstration projects. The ultimate purpose is to get more teachers of the disadvantaged to introduce instruction in creative problem solving in their classes.

Problem

While teaching for effective thinking and problem solving has long been a stated goal in American education, there is substantial evidence that this goal is not being achieved by our schools. Educators have observed the discrepancy between our goals and actual school practices. The critics of education have not, apparently, stimulated any widespread change in classroom behavior. As the world is confronted by an increasing number of

critical problems, and students become increasingly sensitive to the need to be educated to solve them, more and more pressures are brought to bear on teachers and school administrators. Intensive efforts are needed to provide teacher, administrators, and students with the skills, resources, and information that are needed to broaden the range of instructional activities. The need for such efforts is dramatically underscored when specific consideration is given to disadvantaged segments of our population.

A Conception of Creative Problem Solving

Guilford and Holpner (1971) have carried out extensive research on problem solving abilities. They conclude that there is no single problem solving ability. Instead, there are a number of abilities involved in the complete problem solving process. They concluded from their factor analytic studies of problem solving that the following abilities are major cognitive functions in problem solving: (1) thinking rapidly of several characteristics of a given object or situation; (2) classifying objects or ideas; (3) perceiving relationships; (4) thinking of alternative outcomes; (5) listing characteristics of a goal; and (6) producing logical solutions (pages 104-107).

Rationale

Children from some disadvantaged families face severe handicaps at home and in school in their cognitive development. Effective thinking, creativity, and problem solving are neither valued highly, nor adequately modeled, in the home, and teachers lack skill in developing these abilities among children in the

schools. The problem addressed in this project was to provide a comprehensive, interpretive survey of theory and research concerning the need, implementation, and evaluation of materials and methods for fostering creative development and improving problem solving abilities among disadvantaged elementary school pupils. The material produced in the project will be intended to be directly useful for classroom teachers and school administrators in schools in which large numbers of disadvantaged elementary school pupils are enrolled.

The definition of disadvantaged children used in this project refers to youngsters who have suffered some deficit in their cognitive development due to socioeconomic and/or ethnic background factors in their homes, schools, and community. Creativity and problem solving have been united into a single complex concept following the model proposed by Guilford (1967). This model stresses the fact that many discrete creative abilities such as fluency, flexibility, and originality, while measureable and trainable separately, are in reality indispensable components of realistic and complex problem solving behavior. Puzzle type problems might involve only restricted logical thinking abilities. Real life problem solving is really creative problem solving in that it requires a wide range of creative, conceptual and logical thinking abilities.

It is a frequently expressed goal of American education, at all levels, to foster cognitive growth among children, and particularly to help children think creatively and to become better

problem solvers. In their text, Teaching For Thinking, Raths, Wasserman, Jonas, and Rothstein (1967) state the case, in general terms, as follows:

There is a widespread verbal recognition of the importance of thinking. We want our children to be able to think for themselves, to be self-directing, considerate, and thoughtful. In situations which are new to them we hope they will be able to apply knowledge which they have gained in the past.
(p. 1)

The importance of research on creativity and problem solving more specifically, has been described by Parnes (1967), Torrance (1965, 1967), Torrance and Myers (1970), Guilford (1967) and others. Guilford has described the importance of creative problem solving in education in an especially provocative way:

It is apparent that the solutions to numerous human problems are dependent upon education of the world's population....An informed people...is a creative, problem-solving people (1967, p. 12).

Despite the fact that teaching pupils to think creatively and to solve problems are central goals of education, American schools have failed to a large extent to provide appropriate instruction; this problem seems especially critical for disadvantaged children. While some problem solving activities are found in most science and mathematics curricula, and in some social studies programs, they tend to follow narrowly-prescribed traditional modes of inquiry, and frequently involve trivial problems. Furthermore, even these simple attempts are often not included in the curriculum in inner city schools.

Many of the characteristics which teachers appear to value most highly, and so to cultivate in their classrooms, may be

inimical to the improvement of creative thinking and problem solving abilities. Torrance observed:

...teachers and parents give evidence of being more concerned about having "good children", in the sense of their being easy to manage, well-behaved, and adjusted to social norms. It is rare that we are genuinely willing for a child to achieve his potentialities (1965, p. 14).

The problem of developing "good" or well-behaved children as opposed to teaching children to become more creative thinkers and better problem solvers is particularly acute in inner-city schools. Teachers in these schools are very much concerned with discipline and "good behavior." Frequently, such behavior is emphasized at the expense of more appropriate cognitive goals.

There are also indications that many of the skills and cognitive abilities which are stressed in school are likely to result in further handicaps for disadvantaged children. Many studies have shown that disadvantaged children often perform poorly on the measures of achievement, intelligence, and cognitive development which are predominantly used in public school settings (Bloom, Davis, and Hess, 1965; Deutsch, Katz, and Jensen, 1968; Frost and Hawks, 1966; Kennedy, Van DeRiet, and White, 1963).

Examples of areas in which disadvantaged children have been found to be limited, which may also be importantly related to the development of problem solving, creative thinking, and other complex cognitive abilities, include: verbal skills and symbolic representation (Vairo and Whittaker, 1967; Blank and Soloman, 1969; John, 1963; John and Goldstein, 1967); abstract thinking and flexibility (Roberts, 1967; Hirsch, 1969; Jensen, 1968); general reading

abilities (Stauffer, 1967); and problem solving (Feldhusen, et al., 1972; Houtz and Feldhusen, 1975).

Recent research has been directed towards the identification of strengths of disadvantaged children. Torrance (1973) developed a checklist to assist in the identification of creatively gifted disadvantaged children. This checklist presents a variety of behaviors that may be observed when children are actively engaged in classroom activities. The behaviors reflect strengths and abilities which can be developed through appropriate instruction.

Often, disadvantaged children's classrooms include instructions, books or problems which are too abstract or meaningless for them. Instead, they need first to understand concepts on a "personal" level, by working with those things with which they are most familiar.

Children must learn to determine differences between relevant and irrelevant information, to make hypotheses, and to evaluate their ideas. Bruce (1967) asserts that these aspects of problem solving are neglected in schools. Although texts may show how others have sought answers to their questions, disadvantaged children need to be active participants in solving problems which are relevant to them in order to develop these cognitive processes. Jarvis (1965) stressed the need for disadvantaged elementary school children to be explicitly taught the intellectual operations of critical thinking, rather than teaching them what to think, or expecting that they will learn these operations as a by-product of their classroom studies.

Instead, teachers should introduce problem solving instruction,

and through this instruction develop the material (Jarvis, 1965). Kelson (1968) suggested that the curriculum should include materials built around real or relevant problems. Using such materials, knowledge and skills could be introduced as needed. There would be no need to teach discipline-oriented knowledge simply because it might be useful later.

Dawson (1970) called for learning situations which would interest the students, relate to their daily lives, and involve them in the learning process. Dawson found that role playing with realistic problem situations can be used to encourage the students to engage in planning, imaginative thinking, problem solving, and discussion. He concluded that students not only learned by handling relevant problems through acting them out, but also learned to take and give criticism.

Torrance (1974) recently suggested that planning for and thinking about the future be used as vehicles in developing children's creative thinking and problem solving abilities:

Schools are accustomed to teaching to deepen children's understanding of a present event by helping them learn about its history. It is just as important to help them speculate knowledgeably about the event's future (p. 65).

Disadvantaged children can use their positive strengths and abilities in oral expression, movement, and acting as well as in discussion, writing and creative art to tackle the problems of the future. Hopefully such experience will better equip them to deal with present problems.

Ross (1968) asserted that there are no disadvantaged children in art, since all children have feelings and can express them.

Techniques were described to help students become more aware of their environment. By having them photograph various scenes around the city they began to see the environment in a new way and tried to shape it artistically. By doing this, Ross argued, they could develop insights and perceptions necessary to reshape the environment in later years. This assignment also had other influences. The students were able to question (and try to answer) what their place was in the environment. The photographs and paintings helped them compare objective reality to a subjective record thereby offering them a better view of the world. The creative study of their environment may also have produced some parallel growth in other areas. The students seemed to be more motivated to read, to gain more information on the subjects photographed, and to write about their creations.

Torrance (1969) proposed that developing the potential of disadvantaged children is possible, but that our efforts have been limited by our failure to identify and develop the talents which are valued by particular subcultures. Torrance identified a set of "creative positives," which he concluded occur among disadvantaged children with high frequency, and upon which programs for the development of talent might successfully be created. These "creative positives" were: high non-verbal fluency and originality; high creative productivity in small groups; adeptness in visual art activities; high creativity in movement, dance, and other physical activities; high motivation for games, music, sports, humor and concrete objects; and rich imagery in language. Torrance (1969,

76-77) also described characteristics of school programs for disadvantaged children which have attempted to provide opportunities for talent development (Witt, 1968; Howe, 1969; Bruch, 1969).

Torrance (1971) reviewed studies of differential performance of racial groups and socioeconomic class comparisons on measures of creative thinking in a wide variety of geographic areas. In reviewing more than a dozen studies, Torrance noted that in relation to verbal creative thinking abilities, most studies reported either superior performance by advantaged pupils, or no significant differences. In many studies of non-verbal creative thinking abilities, however, disadvantaged students scored as well or better than more advantaged groups. Torrance concluded that the creative potential of disadvantaged children must be respected and developed in school and community programs. Such emphases may be as important as or even more important than emphases on compensation of deficits.

Approaches to Training

It seems there are many different ways for teachers who recognize the importance of creativity and problem solving to bring training in these areas into their classrooms. Teachers can also plan ways to use this training in subject areas already in the curriculum. However, teachers need to have a better understanding of creative problem solving before they can present it to their students (Jarvis, 1965). Above all, the problem of providing training which may be too abstract, and therefore irrelevant and confusing for the child, must be avoided.

Disadvantaged children are greatly influenced by the environment in which they live. Their homes and school experiences may affect them in such a way as to hinder their growth in concept formation, verbal proficiency, and transition from concrete to abstract thought. These areas are important in the development of problem solving abilities.

A number of programs and sets of instructional material are now available for teaching creative problem solving. While it seems that creative and energetic teachers can do much to develop and use their own materials and methods for teaching creative problem solving, hopefully systematically developed and evaluated materials could make the teacher's task easier or could help teachers do a better job.

Chapter 3

Reviews of Instructional Material and Books For Teaching Creativity and Problem Solving

This chapter presents the reviews of instructional materials and books on teaching creative thinking. The reviews of instructional material contain much specific information. Look at a sample review in that section. Then look at the headings described in Figure I. To the right of the headings are explanations of what each word or words mean.

The reviews will give you all the information you need to make a tentative decision as to the suitability of a kit or set of materials for your needs and interests. All of the reviews describe good, useful, productive instructional materials. Materials were included only after a careful inspection and review of a set indicated that it would be useful in teaching creative thinking or problem solving. When you settle on some materials which look interesting, you should read the entire review carefully.

The reviews of books on teaching creative thinking and problem solving are grouped together at the end of the chapter. These reviews attempt to show how each book would be useful to the classroom teacher. They begin on page 19.

Figure I

The Format of a Review of Instructional Material

What:	This gives the title of the material and the author.
Published By:	This is the name of the company publishing the material and their mailing address.
How To Order:	This part give three pieces of information. The first bit will tell you where to send your orders. Usually this will be the publisher unless otherwise indicated. If it is the publisher it will say "Order from publisher." Use the address given above in the "Published By" section. The second bit of information is the price of the material at the time it was reviewed. The final bit of information tells what items or parts of the material will be expended or lost as the kit is used in the classroom. These items can usually be replaced by the teacher or the publisher.
Description:	This section gives a brief description of the material, how it is used, and its most salient characteristics.
Target Audience:	This section describes the grade level for which the material is intended.

**Materials
Provided;**

This section tells the quantity of the materials provided and names each piece that will come with the kit. The teacher should look at the "How to Order" section to see what materials will have to be replaced.

**Teacher's
Guide;**

If the kit contains a teacher's guide, this section will describe the guide and tell what you can expect from it. It will also tell about follow up activities that are suggested by the guide.

**Subject
Matter and
Teaching
Strategy;**

This section describes how the material can be used in a variety of subject areas. You can use this information to plan how you will integrate a kit into your daily schedule, or use it to plan for creativity sessions in your classroom. The teaching strategy describes the suggested sequence of events that the teacher could use to teach a class. The use of the material with small groups, large groups and individuals is also discussed.

Rationale;

Here the fundamental nature of the material is discussed. Its theoretical bases are described.

What: Audiovisual Involvement Series: Concepts and Values for Early Education

Published By: BFA Educational Media
2211 Michigan Avenue
Santa Monica, California 90404

How To Order: Order from publisher.
List price: Set divided into four series of filmstrips ranging from \$32.00-\$40.00 each.
Consumable items: None

Description: The Audiovisual Involvement Series is a collection of silent filmstrips with teacher manuals designed to elicit the active involvement of children in the development of primary learning skills, concepts, and values through role-playing activities. The children interact with the scenes or with the objects projected onto the screen in experiences directed toward building and refining observation skills, thinking skills, self-expression/creative expression, problem-solving, reasoning, and vocabulary development.

The series consists of thirty-one silent filmstrips. Seven major themes are represented (reasoning, using my imagination, let's pretend, taking care of myself, taking care of things around me, how I live in my world, and the problems of my world) and each theme unit has a teacher's guide which provides appropriate directions and questions for each filmstrip pre-

sentation.

The first three units are appropriate to developing problem solving skills and creative expression in children. The remaining four units deal with instruction in personal hygiene and safety, attitudes toward the care and preservation of personal and public property, scientific concepts, and social awareness.

Unit One, entitled "Reasoning," consists of four filmstrips which involve the children in acquiring important observation skills for both reading and for problem-solving. Visual discrimination and visual memory are strengthened through exercises showing a grouping of objects, then showing the same grouping with one or more of the objects missing or added. Students are asked to identify the missing items. Skills in classification, in knowing what evidence to look for in solving a problem, and how to interpret evidence are developed by the presentation of different settings from which children are asked to interpret the evidence and determine such things as "What is it like?", "What things do you need here?", "Where is this place?" This unit also presents the pupil with open-ended types of situations in which the student is asked to evaluate, to

think of possible courses of action, and to state which action he or she would choose.

Unit Two, entitled "Using my Imagination," contains five silent filmstrips which present fantastic situations as aids in the development of basic conceptual skills (e.g. likenesses and differences, relative location and size, and geometric shapes). Creative expression is encouraged by asking each child to imagine how different projected objects might sound, feel, and taste. Children are encouraged to make comparisons of different objects and to suggest how things are similar and how they are different. Another filmstrip asks the children to use their imagination as they place toys or themselves in various positions on the screen. Here the emphasis is on skills relating to relative location discrimination.

Unit Three, entitled "Let's pretend," consists of four filmstrips which present imaginative situations designed to promote and sharpen students' ability to describe their reactions to a variety of situations, actions, shapes, and objects.

Because these filmstrips use images rather than words to stimulate creative functioning, they should be particularly effective for use

with disadvantaged children.

**Target
Audience:**

Primary and elementary grades.

**Materials
provided:**

The series contains thirty-one silent filmstrips on seven major themes. Each theme unit is accompanied by a guide which offers directions and questions for each filmstrip presentation.

**Teacher's
Guide:**

Each guide which accompanies the specific theme unit provides information on how to use the Audiovisual Involvement Series effectively to ensure the active participation of the children in each activity. Each frame of the filmstrips is described and sample questions are suggested for the teacher. Follow-up activities are suggested for each individual unit. The filmstrip itself contains a synopsis of the suggestions offered in the teacher's guide, and it is suggested that the teacher review the filmstrip one day before it is presented to the children.

**Subject
Matter and
Teaching
Strategy:**

The Audiovisual Involvement Series is designed to develop language skills and concepts by using filmstrip pictures as the basis for instruction. Children stand in front of the screen and role-play in scenes or with objects

projected on them. The picture may be projected directly onto a child or children (who are clothed with a white covering) who then "become" the picture. On-screen participants interact with off-screen participants. Presentation is controlled by the teacher who asks questions which are provided in each teaching guide of the unit.

Rationale:

The Audiovisual Involvement Series is based on the rationale that children learn easier and better when they're actively involved in the presentation of materials. This immediate participation in the learning experience is uniquely realized by having children interact in a role-playing manner with a picture screen, with classmates, and with the teacher in directed experiences intended to build and refine various language, reading, and creative abilities.

What:**Creating Learning Centers**

Set 1: Intermediate Level by Margaret Hughes
and Peggy Dakan

Set 2: Primary Level by Sue Parker and
Dorothy Thompson

**Published
By:**

Creative Teaching Press, Inc.
511 Hermosa Vista Avenue
Monterey Park, California 91754

**How
To
Order:**

Order from publisher.
List price: \$5.95
Consumable items: None

Description:

Creating Learning Centers presents materials and ideas for teachers and students on how to set up and use learning centers to facilitate discovery learning. Ideas are grouped into four categories: Science and math, language arts, social studies, and miscellaneous subjects. The activities involve learning and discovering facts about nature, numbers, literature, history, and language.

**Target
Audience:**

Set 1, Intermediate elementary
Set 2, Primary (grades 1-3)

**Materials
Provided:**

56 Idea Cards, outlining objectives, materials, and activities.

Notes to the teacher.

**Teacher's
Guide:**

An introduction addressed to the teacher is included that describes learning centers and what they should include. Suggestions are offered, but teachers are encouraged to fashion the center

to suit their individual class needs.

**Subject
Matter and
Teaching
Strategy:**

The learning center is, by its very nature, a free-form activity that can be molded to fit the individual teacher and the class. The general teacher suggestions presented in Creating Learning Centers show how to develop a center that reflects the needs and abilities of one particular class. The activity cards enable the teacher to set up a learning center and select appropriate materials. Learning centers may involve an entire class at once, small groups, or individuals on their own time. They may take the form of extra credit activities, or be used as a regular part of the weekly or daily curriculum. The teacher can explore the ideas and establish the best way to use them in the classroom.

Rationale:

The kits are a product of the belief that student involvement and teacher-student interaction are vital conditions for effective learning. When students work on their own, and are interested and enjoy their studies, their performance and growth are especially rewarding.

What: Creative Activities for Language Arts
 For the development of Individual Creative Abilities
 Genevieve Bylinowski

Published By: Hayes School Publishing Company, Inc.
 Wilkinsburg, Pennsylvania 15221

How To Order: Order from publisher.
 List price: \$3.00.
 Consumable items: 30 spirit or liquid duplicating masters.

Description: Creative Activities for Language Arts is a collection of creativity-oriented ideas that involve children in writing, drawing, and reading. Each activity is designed to be interesting and stimulating to students and involves ideas and objects that they are familiar with. Some activities require adding parts to stories, drawing expressive pictures, asking questions, and inventing things. All of them allow the young reader and writer to express himself, and they encourage the growth of each child's creative and expressive capabilities.

Target Audience: Children 7-12 years old.

Materials Provided: A booklet of 30 8" x 11" duplicating masters of ideas. Each sheet contains enough space for each child's responses. Introduction and notes to the teacher.

Teacher's Guide: The introduction presents the purpose of the booklet, and a short comment is given for

each of the 30 activities. The comments explain the rationale for the particular activities, and sometimes suggest how an exercise can best be used in the classroom.

**Subject
Matter and
Teaching
Strategy:**

The activities are all directed towards the development of the individual student's language-related creative abilities. The collection does not form a self-contained program, but instead is intended to be a supplement to normal instruction that can be used whenever the teacher desires. Each exercise could be presented to one student, or to an entire class.

Rationale:

Creative Activities for Language Arts is based on the concept that in order to develop children's creative thinking, they must have varied practice in producing ideas. By challenging children, the activities encourage individual expression and depth of thinking that is essential to creative development.

What: Creative Expression: Lower Primary
 Billy Leon Shumate
Creative Writing: Primary
 Billy Leon Shumate
Creative Writing: Intermediate
 Alice and Lawrence L. Tomas
Creative Writing: Upper Intermediate
 Lawrence L. Tomas

Published By: Milliken Publishing Company
 1100 Research Boulevard
 St. Louis, Missouri 63132

How To Order: Order from publisher.
 List price: \$7.95 for each level.
 Consumable items: Duplicating masters.

Description: Creative Expression and the three Creative Writing books constitute a series designed to stimulate children to think, to detect and express their feelings and attitudes, and to creatively extend what they learn. Creative Expression is designed for those without writing skills, and accordingly requires oral responding. The other books of the series concentrate on creative expression through writing. Colorful transparencies that entertain and hold the attention of children are central to the kits.

Duplicating masters of activity pages ask opinions and invite creative answers about the

situations depicted. Creative writing suggestions are included in the upper levels, with thematic pictures provided in the lower primary booklet.

Target Audience:

Lower Primary to Upper Intermediate.

Materials Provided:

8½" x 11" color transparencies of discussion themes and situations for use in overhead projectors. (Booklets are available without transparencies.)

Duplicating masters provide individual facsimiles of transparencies for each student's personal use.

Teacher's Guide:

Also included for the teacher are objectives for each unit, suggested questions, and additional activities.

Subject Matter and Teaching Strategy:

Themes for each unit are of everyday activities, special events, fantasy, animals, and other subjects that are interesting to the child and can stimulate his or her thinking. The series may be useful as an occasional addition to normal classroom work or as a regular part of the class activities. Students could use the activities individually and progress as they desire.

Rationale:

Emphasis is placed on encouraging the child to express himself and his ideas, while grading and criticism are de-emphasized. Individual differences are recognized and accounted for, and

the importance of the recognition of and the expression of each child's individuality is stressed.

What: Creative Expression Books
 Scholastic Book Services

Published By: Scholastic Book Services
 901 Sylvan Avenue
 Englewood Cliffs, New Jersey 07632

How To Order: Order from publisher.
 List price: \$.60 per book. A free Teaching Guide is included with orders of 10 or more of any title.
 Consumable items: Individual workbooks.

Description: Each creative expression book, written to build spelling, vocabulary, grammar, and thinking skills at a particular grade level, consists of fourteen creative writing lessons bound in a colorful, imaginatively designed paperback cover which is not marked for grade level. Each lesson is created to stimulate written expression using a specific technique. Topics covered include parody, detective writing, free verse, cinquains, haiku, descriptive writing, rhymed poetry, and many other types of creative writing. Two basic kinds of lessons are presented. In one kind an explanation of a technique, such as haiku, is followed by examples and pictures for the student to write about. In another type, lesson pictures are presented and the student is asked to write about them in a particular way--for instance, as if he were experiencing the scene pictured. Many of the pictures accompanying

the lessons show black and white children in inner-city or urban settings. Topics of current interest such as conservation, over population, and the world food supply are included.

**Target
Audience:**

Grades 2-6.

**Materials
Provided:**

Each of the five workbooks provides space for individual writing in response to each lesson and a page for an individual wordlist. Book titles and grades are the following: "Dinosaur Bones," grade 2; "Jungle Sounds," grade 3; "Ghost Ships," grade 4; "Cook Up Tales," grade 5; "Adventures with a Three-Spined Stickleback," grade 6.

**Teacher's
Guide:**

The teacher's manual to accompany each book provides the rationale for using the workbook and suggests optimum conditions for using the lessons. Discussion ideas are given for each lesson so that the teacher can encourage oral expression. Ideas for follow-up activities are also listed.

**Subject
Matter and
Teaching
Strategy:**

The content of these lessons is particularly applicable to language arts since lessons involve creative expression, both oral and written, and emphasize creative use of words. The workbooks could be used by a whole class during a

writing period or they could be used by small groups or students individually. They would also work well as available material in a learning center.

Rationale:

These workbooks are designed to stimulate exploration and articulation of thoughts and feelings and to encourage creative written and oral expression.

What: Creative Language Projects: Independent Activities In Language Arts (Books A-E)

Mary Pat Mullaney

Published By: Milliken Publishing Company
1100 Research Boulevard
St. Louis, Missouri 63132

How To Order: Order from publisher.
List price: \$3.75 per booklet
Consumable items: Each booklet contains 28 duplicating masters.

Description: Creative Language Projects requires students to think creatively, use their imagination, think of unusual ideas, and solve unusual problems. The individual problems are meant to be fun and give children practice in expressing themselves in a creative manner through original writing, evaluation, and problem solving.

Target Audience: Book A, Grades 1-2
Book B, Grades 2-3
Book C, Grades 3-4
Book D, Grades 4-5
Book E, Grades 5-6

Materials Provided: Includes 8½" x 11" duplicating masters (28 per book) of illustrations and related questions that require opinion, problem solving, and creative expression of the child's own thoughts about the problems and situations presented.

Teacher's Guide: Booklets are prefaced by an explanation of the exercises and how the teacher may best use them.

**Subject
Matter and
Teaching
Strategy:**

The exercises that comprise each booklet concern everyday objects, animals, and people that the child should be familiar with. The materials may be used as supplements to regular reading or English programs, for extra credit, or for whatever specialized purpose the teacher desires. The projects may be most useful when a more informal fun atmosphere is desired in the classroom.

Rationale:

Emphasis is placed on the individual nature of each child's creative processes and abilities. Through individual use of the activity sheet replications, children can find their own answers and express themselves in relation to ideas, objects, and events common to their own world.

What: Creative Moments Kits

Published By: Creative Teaching Press
514 Hermosa Vista Avenue
Monterey Park, California 91754

How To Order: Order from publisher.
List price: \$1.95.
Consumable items: None.

Description: Creative Moments Kits is a collection of exciting creative activities which are organized in convenient folders. Each folder presents a complete activity. The folders are stored in a file box for easy access by individual pupils.

Target Audience: Elementary grade levels.

Materials Provided:

Kit 1 - Creative Moments for Children. For ages 4-9. Contains fifty activity folders, which use readily available materials. Easy-to-follow directions and illustrations are found in each folder. Five different areas are presented: story projects, creative games, design ideas, discovery experiments, and challenge folders. Activities vary from growing a garden in a glass to creating designs with straws.

Kit 2 - Creative Moments for Children. For ages 8-12. Fifty activity folders are found in this kit. Directions and illustrations are given on each folder. Five different areas are presented: imaginations, creative games, design ideas, discovery experiments, and challenge folders. Activities include writing secret codes to organic gardening.

Kit 3 - Creative Moments Investigations. For ages 10-14. Contains fifty scientific activities. Directions and illustrations are provided on each folder. Covers five areas of study: ecology, chemistry, physics, people, and investigation techniques. Activities range from organizing a laboratory to examining crystals.

Teacher's Guide: None provided. Directions and illustrations are given on the individual folder.

**Subject
Matter and
Teaching
Strategy:**

The activities can be used to supplement classroom exercises or to provide children with alternative activities after completing required class work. They can also be used effectively as homework. The activities are designed to be used individually or in small groups. Students are provided with directions on each folder, so further directions from the teacher are not required.

Rationale:

Creative Moments Kits provide children with inviting and challenging activities. Children are free to explore and develop their thinking abilities. The reusable folders allow each child to try all activities, and to return to favorite activities, reaching a new level of understanding each time.

What: Creative Teaching Series

Published By: Allyn and Bacon, Inc.
150 Tremont Street
Boston, Massachusetts 02139

How To Order: Order from Publisher.
List price: Range from \$4.95 - \$8.95
Consumable items: None

Description: The Creative Teaching Series is comprised of seven books concerned with creative teaching in the elementary schools. Each book contains methods and activities that promote creativity in the classroom. Seven different areas are covered: setting conditions for creative teaching, language arts, reading and literature, creative arts, social studies, mathematics, and science.

Target Audience: Grade levels 1-8

Materials Provided: Setting Conditions for Creative Teaching in the Elementary School is the first book of the series. The first part of the book is concerned with the nature of creativity. It offers a definition of creativity and characteristics of creative individuals. Part two of the book presents ways in which to nurture creativity in the classroom.

Creative Teaching of the Language Arts in the Elementary School offers methods for supporting creativity in the language arts. Areas covered by the book include listening, oral expression, creative writing, handwriting, grammar, word usage, and spelling.

Creative Teaching of Reading and Literature in the Elementary School presents principles of creative development in reading and literature and ways teachers can use these principles in the classroom. Reading in the primary and interme-

diary grades, literature, and poetry are covered in this book.

Creative Teaching of the Creative Arts in the Elementary School is the third book of the series. Methods for supporting creativity through art, music, dance and rhythm, and dramatization are presented.

Creative Teaching of the Social Studies in the elementary school offers techniques for nurturing creativity in the social studies. The book discusses the use of textbooks, audiovisual methods, individualization, buzz groups, brainstorming, and various other methods.

Creative Teaching of Mathematics in the Elementary School presents ways of teaching mathematics creatively. Addition, subtraction, multiplication, and fractions are some of the areas covered in the book.

Creative Teaching of Science in the Elementary School is the final book of the series. It deals with methods which foster creativity in science.

Teacher's Guide:

Each book is designed as instructional material for teachers.

Subject Matter and Teaching Strategy:

Each of the seven books covers a different subject area. Teachers can easily take the principles of creative teaching which are presented and adapt them to their own classrooms.

Rationale:

The ideas and principles presented in the books are designed as guidelines for creative teaching in the elementary school. Each book proposes to build favorable attitudes towards creative teaching rather than to develop a "cookbook" of teaching methodology.

What: Creative Writing Skills (Book I and Book II)
 C. M. Charles and M. Church

Published By: T. S. Denison and Company, Inc.
 5100 West 82nd Street
 Minneapolis, Minnesota 55431

How To Order: Order from publisher.
 List price: Book I (No. 513-0077-8) @ \$3.95 each
 Student Workbook (No. 513-00180-8)
 @ \$.60 each
 Book II (No. 513-00179-4) @ \$3.95
 each
 Student Workbook (No. 513-00178-6)
 @ \$.60 each
 Consumable items: None

Description: Creative Writing Skills (I and II) offers the elementary school teacher a series of easy to teach writing exercises which develop creative writing skills. Each series of exercises was designed to increase the generation and flow of ideas from children and to develop skills of putting these new ideas into language. Each series of lessons emphasizes thought, rather than handwriting, punctuation, grammar, or capitalization. These latter skills should be developed in the language curriculum. This program offers writing activities which can augment and supplement the present language curriculum in important ways.

Creative Writing Skills (I and II) seeks to achieve these four specific goals: (1) to improve the child's ability to select words and

phrases that are appropriate to a situation, (2) to develop organization skills incidentally through purposeful writing activities, (3) to teach children how to write reasonable, coherent, possible, and satisfying endings, and (4) to encourage unusual and exciting beginnings to their compositions. Each lesson concentrates on developing particular components of a composition (i.e. main ideas, supporting ideas, topic sentences, sequence, paragraphing) rather than entire compositions. The lessons were designed to be taught in their proposed sequence. However the lessons are internally flexible enough to be modified to suit the needs of the class.

**Target
Audience:**

Creative Writing Skills (Book I) is designed for use in grades K-3. Creative Writing Skills (Book II) is designed for use in grades 4-6.

**Materials
Provided:**

The Creative Writing Skills program consists of a teacher's manual and a student workbook. The student workbook contains pictures and writing space which corresponds to the various lessons described in the teacher's manual.

**Teacher's
Guide:**

The guidebook for teaching creative writing skills describes and explains the Creative Writ-

ing Skills program. The time for each writing exercise is given. The purpose and goal of the lessons are described. Procedures for the activity are explained and suggestions on how to make "the most efficient use of the lessons" are also given.

A copy of the student workbook is attached to the teacher's guidebook.

Subject
Matter and
Teaching
Strategy:

Creative Writing Skills (Books I and II) are designed for use as a supplement to the regular composition curriculum. Mechanics of writing is not stressed explicitly. The program emphasizes activities which increase the generation and flow of ideas and the development of writing skills for putting these new ideas on paper rather than skills of handwriting, punctuation, grammar, or capitalization.

Each writing activity can be effectively performed by the entire class for periods of 25-30 minutes. They will be most effective if separated by no more than two days between lessons. Although the program is designed to develop a particular skill in a systematic, sequential way, each lesson is internally flexible enough to be modified to meet the needs of the class.

Rationale:**Creative Writing Skills (Books I and II)**

is based upon the rationale that no matter what the backgrounds of children are, they can learn to think more creatively and write more effectively. The exercises in this program were designed to make each child a better communicator. Skills of communication are very important and generally can be developed only with practice. This writing program attempts to inspire children to create novel ideas and to provide guidance in ways to write more effectively.

What: Educational Insights Boxes

Published By: Educational Insights, Inc.
211 South Hindry Avenue
Inglewood, California 90301

How To Order: Order from publisher.
List price: \$5.95.
Consumable items: Optional student workbooks.

Description: Educational Insights Boxes offers exciting exercises in creative thinking for elementary school children. Games, activities, and skill builders are written on separate index cards; dividers for different sections are provided; the box doubles as a file. Boxes for five subject areas are available.

Target Audience: Grades 1-6.

Materials Provided: The Language Arts Box consists of 150 games, activities and skill builders. The lower grade level activities are found at the beginning of each section. There are eleven sections which include creative writing, organization aids for creative writing, manipulations, public speaking, dramatics, radio and television, informational writing, language skills, spelling, vocabulary development, and parts of speech.

Elementary Science Experiments consists of 135 experiments and activities. It contains twelve different sections dealing with magnetism, electricity, air, aerophysics, simple machines, weather, heat, water, chemistry, sound, light, and extra material. Student workbooks, at \$1.50 each, and a teacher's edition, at \$1.85, are available from publisher.

The Art Box contains creative art activities for the intermediate grades. Four different sections including a general introduction, behavioral objects, two-dimensional activities, and three-dimensional activities.

Write On! is a collection of 70 creative writing ideas and teacher techniques. The different sections deal with a writer's workshop, motivators, word power, flair for fantasy, holiday happenings, and potpourri.

Mind Expanders consists of challenging activities designed primarily for gifted students. They are to be used individually by the student. Six different areas are covered: math, creative writing, art, social studies, poetry and book reports, and science.

**Teacher's
Guide:**

Each box contains an index card directed to the teacher. This card presents a general overview of the box and the activities provided.

**Subject
Matter and
Teaching
Strategy:**

The activities, games, and skill builders can be used to supplement a classroom presentation of a subject area. The group as a whole may engage in the exercises, or each child can work independently. A teacher may expand the box by adding new activities.

Rationale:

The boxes offer creative and inviting activities. These activities provide students an opportunity to think and discover, and in this way, increase their knowledge of the subject area and their creative thinking abilities.

What: The Five Sense Store;
The Aesthetic Education Program
 Cemerel Inc.

Published By: The Viking Press
 Lincoln Center for the Performing Arts
 625 Madison Ave.
 New York, New York 10022

How To Order: Order from publisher.
 List price: Prices vary greatly; refer to catalog.
 Consumable items: None.

Description: The Aesthetic Education Program is a unique system of materials, media games, and viewpoints which assist students in developing feeling and aesthetic responses. Such techniques as creating characterization; working with tone, shape, sound, movement; constructing dramatic plot; and creating word pictures help students develop their aesthetic abilities.

Target Audience: Grades K-12.

Materials Provided: The materials vary with each kit: Everything from cameras and games to masks, rhythm blocks, magnetic tape and cartoons.

The available kits are

Examining Point of View
 Creating Word Pictures
 Relating Sound and Movement
 Tone Color
 Creating Characterization
 Constructing Dramatic Plot
 Shape
 Shapes and Patterns
 Shape Relationships
 Rhythm/Meter

**Teacher's
Guide:**

The Teacher's Guides in this series include notes regarding each concept in the student's books, objectives of the activities, and reduced reproductions of the pages of student books. Supplementary activities are also discussed. The Teacher's Guides are well illustrated and easy to use.

**Subject
Matter and
Teaching
Strategy:**

The program involves the development of creative skills in reading, analogies, perception, identification of shapes, color, patterns, dramatic plots, sound, and movement.

The Five Sense Store is effective in individualized and small group learning centers, as class projects, and as an integral part of a language or artistic skills program. Regardless of the way used, the Aesthetic Education Program serves as a valuable supplement to an educational program.

Rationale:

The Aesthetic Education Program provides guidance and experience in a wide variety of affective and aesthetic activities. The program uses the do and create approach. The activities require total involvement of the child including making decisions, developing ideas, and critical thinking. Through its rich

and diverse activities children can learn to develop their affective, aesthetic and cognitive ability. In particular, the close relationship between cognitive creative abilities and affective dispositions should be developed.

What: The Fun Creative Writing Program

Published By: Fun Publishing Company
P. O. Box 40283
Indianapolis, Indiana 46240

How To Order: Order from publisher.
List price: Complete Classroom Kits . . \$28.50
Fun Journals. \$ 2.50
Professional Books \$ 3.00
Consumable items: Tests.

Description: The Fun Creative Writing Program is not just a comprehensive creative writing program--it is also a creative experience. Through this program, the student learns to imagine, to organize, to write, to listen, to read, to observe, and to think.

Target Audience: Grades 1-8.

Materials Provided: Classroom Kits (one kit for each grade level):
Studybook. A soft-covered book, with activities planned for one year. Provides the student with various inviting activities which help promote creative writing skills. 25 copies.
Comprehension test. Provides an evaluation of the student's understanding of the basic concepts and principles found in the studybook. 25 copies.
Answer key. Teacher's answer key for the comprehension test.
Classroom progress chart. When displayed in the classroom, each student is able to view his/her own progress in developing creative writing skills.
Emergency kit. Fifteen creative writing lessons, which help the teacher stress specific points. They may be duplicated or used on an overhead projector.

Picture pack. A number of pictures which offer possible article and story material.

Teacher's Manual.

Fun Journals. A collection of stories, poems, and articles written by children. Primary, intermediate, and junior high levels are available. Children using The Fun Creative Writing Program are encouraged to submit material for publication.

Professional Books. Books which answer questions concerning the teaching of creative writing. Two different books, one geared to elementary teaching, the other to junior high level, are available.

**Teacher's
Guide:**

A teacher's manual is provided with each classroom kit. It contains simple lesson plans, ideas, and suggestions for motivating children to use the study books.

**Subject
Matter and
Teaching
Strategy:**

The Fun Creative Writing Program may be used as a separate program, or adapted for use in existing school curricula. A single grade level may be used, or different levels introduced as the child progresses.

The program offers various activities which develop skills necessary for writing creatively. The teacher can use any of the materials separately, or he/she can present a lesson or activity from one of the materials and supplement it with the remaining materials. The teacher can also present an original idea or activity and then find related activities in the program.

Rationale:

The Fun Creative Writing Program attempts to stimulate children's creative writing. It offers interesting activities which serve to improve skills necessary in writing. Children not only learn these skills, but their enjoyment of their own creativity will be enhanced.

What: Ideabooks
Published By: R. E. Myers and E. Paul Torrance
 Ginn and Company
 Statler Building
 Boston, Massachusetts 02154

How To Order: Order from publisher.
 List price: Ideabooks @ \$.72-.75.
 Teacher's Guides @ \$.63-.69.
 Consumable items: Ideabooks.

Description: The Ideabooks are a unique contribution to any classroom. They are designed to involve pupils in activities which require them to be both receptive to and critical of their own ideas and those of others, to analyze problems, to elaborate ideas, to explore possibilities, and to see relationships. Plenty of room is provided in each workbook for the pupil to work out his ideas.

Can You Imagine?--the Ideabook for grades 1 and 2--contains units of imaginative and thought-provoking exercises for children. Exercises in seeing relationships, exploring possibilities, analyzing ideas and elements, and elaboration abound in Can You Imagine? Questions are used to open the imagination of the children. Through the questions and suggested activities learning becomes fun and children make good progress in basic reading and writing skills.

For Those Who Wonder presents 22 units of challenging ideas for use in grades 3 or 4. This ideabook has been created to help keep children's need to wonder alive and to aid teachers in respecting the child's right to wonder. This sense of wonder is what is called "curiosity." For Those Who Wonder challenges the student with a series of questions such as "What could happen if cars never wore out? Why is a middle-aged woman like a snowshoe rabbit? Is a month a mile?"

Where does the cold go?" There is no single answer to these questions and no special need to use this ideabook in a prescribed manner. Throughout the series, the teacher is encouraged to modify any exercise to suit the interests and needs of the pupils.

Invitation to Thinking and Doing, for grades 4-6, offers 24 training exercises in exploring, questioning, experimenting, imagining, testing, and modifying that can be expected to increase creative thinking in almost any curricular field--language arts, science, mathematics, social studies, reading. Each unit is designed to challenge the pupil and cause him to puzzle or to search.

The exercises in Invitation to Speaking and Writing Creatively, grades 6-8, involve pupils in one or more creative activities of the language arts. Any one of the 21 units will involve the pupil in seeing relationships, elaborating, combining ideas and elements, being sensitive and aware, or exploring possibilities. These exercises should be effective in promoting the creative writing of children. Each exercise is intended to encourage pupils to think and write without being threatened by grades or by time. Suggestions are offered on how these exercises could profitably be used in conjunction with the school's language arts program.

Plots, Puzzles and Ploys, for grades 7-8, is a sequence of 23 exercises designed to launch pupils on adventures of self-expression--thrusting them right into the business of writing a story. Puzzles, riddles, and mysteries are the devices which this Ideabook uses to challenge the thinking of the pupils and to heighten their anticipation in each exercise. Flexible and fluent thinking is emphasized throughout each unit. Analogies, similes, and metaphors are just a few of the literary concepts that are investigated.

**Target
Audience;**

Elementary and junior high school grade levels.

**Materials
Provided;**

The Ideabook series consists of five Ideabooks with a teacher's guide accompanying each Ideabook. Each Ideabook is in a workbook format

and provides plenty of room for the pupil to work out ideas.

**Teacher's
Guide:**

There is a separate teacher's guide for each of the Ideabooks. Each guide provides the teacher with suggestions on how to teach the unit. The authors stress the importance of creating a climate in which a child can think without inhibitions or restrictions. Each unit tells how to set the stage for the lesson, how to present the lesson, how to evaluate children's responses, and gives further activities that might be done to "follow through" on the learning experiences of the completed lesson.

**Subject
Matter and
Teaching
Strategy:**

The Ideabook series deals with the creative thinking abilities of children. The materials in this series attempt to engage children in a sequence of creative thinking activities, leading to increasingly higher stages of thinking. They can be used profitably with language arts instruction. However, they are not confined solely to this subject matter area and the skills which they encourage can be applied to the areas of science, social studies, and social values.

The Ideabooks foster fluency and flexibility of thought. Pupils are encouraged to see relationships between things, to notice similarities

and dissimilarities in events and places, to elaborate upon a simple idea, or to relate one idea to another.

Rationale:

The Ideabooks develop creative thinking abilities in children. Creativity is defined as a natural human process which emerges out of the tension of inquiry. The "need" to find out, to discover the reason, to get the point, to understand, to know "why" is the fertile ground out of which creative thought emerges. Sensitivity to problems, ideational fluency, flexibility, originality, elaboration, and re-definition are a few of the abilities that are developed in the Ideabook series.

What: Images and Imagination: Seeing Creatively

Michael Siegel

Published By: Eye Gate House Incorporated
146-01 Archer Avenue
Jamaica, New York 11435

How To Order: Order from publisher.
List price: \$39.75.
Consumable items: None.

Description: Images and Imagination is a series of four filmstrips and accompanying records or cassettes. It presents a collection of images that are designed to stimulate students to see creatively and attend more closely to the world around them. The images are of objects and places that are familiar, but the camera lingers on those scenes of junkyards, windows, and sidewalks, and allows one to really see and to feel those "familiar" objects in new ways. The emphasis is on the appreciation of the marvelous visual displays of everyday life, and the cultivation of imagination and expression that can arise from such appreciation. Such expression can be a part of many areas of study, including language arts, humanities, photography and art.

Target Audience: Grades 4-8 and high school.

Materials Provided: 4 filmstrips: A. Picture Window
B. Strange Country
C. Sidewalk
D. Reflections of New York

2 Accompanying Cassettes or Records
Teacher's Manual

Teacher's
Guide:

The Teacher's Manual introduces the rationale and objectives of the series, and suggests classroom applications for each filmstrip.

Subject
Matter and
Teaching
Strategy:

The suggestions for applications of the series all relate to using the presentations as stimuli to excite the imagination, expression, and creativity of students. Because the images are of such a general nature, they enjoy a wide applicability to any subject area that relates to visual imagery and expression. Such areas are the graphic arts, photography, and language arts. Some of the content may be useful as discussion material in the humanities and social studies.

The series may be used by individuals in a learning center, with small groups, or with an entire class. Filmstrips may be easily shown to a large group to generate discussion, and to provide a basis for individual interpretations and reactions.

Rationale:

Images and Imagination: Seeing Creatively is designed to develop students' appreciation and individual responses to the visual world.

The richness and satisfaction of really perceiving that world, and the perceptions, feelings, and creative responses that it can foster are the elements that the series focuses upon.

What: Imagination Express: Saturday Subway Ride
 Gary R. Davis and Gerald DiPego

Published By: D.O.K. Publishers, Inc.
 771 East Delavan Avenue
 Buffalo, New York 14215

How To Order: Order from publisher.
 List price: \$3.95
 Consumable items: Detachable master maker sheets to be used with spirit masters or mimeo stencils.

Description: The Imagination Express: Saturday Subway Ride is an imaginative 92-page workbook in a travel story-exercise format designed to teach creative thinking techniques and positive attitudes toward creativity. Pupils buy a ticket for the Imagination Express by paying with a song or story or whatever other imaginative thing each can create and then it is "All Aboard" for a wild, fun-filled adventure which takes him from Kansas City to Pittsburg to Dublin to Tokyo to Santa Monica and back. Just like Alice in Wonderland, the pupil will meet strange and wonderful people and places, experience the fun of creating fantastic happenings and solve interesting problems in the Saturday Subway Ride.

Target Audience: The workbook was specifically designed to be used over a two-to-four month period with intermediate (3-8) grade level pupils.

Materials Provided: One story booklet. This booklet contains seven stories based upon an imaginative subway ride

from Kansas to Dublin and back again.

Eighteen Master Sheets. These detachable sheets provide exercises in flexible, fluent and elaborate thinking which are used in conjunction with the story booklet.

**Teacher's
Guide:**

Imagination Express is intended to be a "point of departure" for elementary grade teachers to begin a new kind of thinking about instructional planning and materials. Imagination Express is a valuable resource of ideas for the enthusiastic teacher in fostering creativity in students.

**Subject
Matter and
Teaching
Strategy:**

Imagination Express provides practice in verbal expression and in creative writing. The story-theme is an around-the-world subway ride with fantastic episodes at each stop, some of which are supplied by the pupil.

Throughout the course of the journey, the pupil is encouraged to demonstrate his understanding of five creative problem-solving techniques by means of the pertinent workbook exercises presented throughout the text. The student learns to identify important attributes or parts of an object, considering each attribute as a source of potential improvement. Students consider each item on a prepared list as a possible source of innovation with respect to a given problem. By means of a metaphorical activity,

students are asked to consider how other people, animals, and plants solve a similar problem. Groups of students use the "brainstorming" technique to find solutions for problems such as "how to turn a classroom into a foreign planet."

The practice activities given in the workbook should help pupils develop verbal fluency and imaginative writing skills.

Rationale:

The Imagination Express: Saturday Subway Ride was intended to stimulate the creative problem solving ability of pupils by fostering a favorable predisposition toward "wild" or imaginative ideas. It is possible to learn to be a more productive and more original thinker by focusing upon the development of strategies of thinking which facilitate the generation of ideas. A child's creative ability can be improved through practice with the techniques of generating new ideas.

The creative development of children depends largely upon the sensitivity and imagination of teachers and curriculum developers. Imagination Express encourages the teacher to find new and different experiences for children.

What: Imagine and Write: My Weekly Reader Creative Expression Series

Published By: American Education Publications
55 High Street
Middletown, Connecticut 06457

How To Order: Order from: Xerox Education Publications
Education Center
Columbus, Ohio 43216
List price: Pupil's book for each grade costs \$.25 each. The Teacher's Guide and a desk copy of the pupil book are free with every order for 10 or more books at one grade level.
Consumable items: Pupil's books.

Description: My Weekly Reader Creative Expression Series

consists of vivid, colorful, creative writing booklets designed to aid elementary school teachers in stimulating and channeling children's imagination and creativity through written work. Vocabulary and literature skills are developed through each book of the Imagine and Write series with emphasis upon the unique creative expression of each child. Each child is the "author and editor" of his/her own workbook. Through the development of ideas the child develops a sense of pride in writing, knowing that he/she is free to develop ideas.

Provocative pictures, open-ended questions, unfinished stories and poems, stories and plot outlines provide the stimuli for the child in each book. Practice in the use of various literary techniques is provided. Imagination

and thought are focused upon single ideas in each book. Checklists to aid the child evaluate and edit work are also included.

**Target
Audience:**

Elementary grades 2-6.

**Materials
Provided:**

The Imagine and Write program includes five 48-page books and a Teacher's Guide.

The Pupil's Book provides pictures, open-ended questions, unfinished stories and poems, and ideas for plots. Practice is provided for the use of different literary techniques and activities that focus attention on word usage. The title "The Unexpected Visitor", for example, offers a range of choice in story plot and stimulates creative thinking.

**Teacher's
Guide:**

The Teacher's Guide which accompanies each book of the series gives the teacher a wealth of ideas for the successful stimulation of a pupil's creative ability. Creative writing is defined and suggestions are offered on how to make the learning environment which the teacher provides favorable to the creative functioning of pupils. The teacher's guide suggests the use of children's literature as background material for the various activities in the pupil's booklet. It offers a carefully constructed program of skill development with an analysis of writing forms and literary techniques. Class activities oriented toward the building of vocabulary and selectivity in word usage are also suggested. Ways of evaluating

creative writing are also pointed out in the teacher's guide. Finally, a step-by-step guided lesson plan for each page in the pupil's Imagine and Write workbook is included.

**Subject
Matter and
Teaching
Strategy:**

Imagine and Write is an extension of the language arts program which is presented each week in My Weekly Reader. Each separate book for each grade (2-6) works to develop creative writing in children. Vocabulary and various literature skills (e.g. reading, identifying elements of a story, etc.) are carefully developed and channeled into the children's personal, individual written work.

Rationale:

Imagine and Write is a program in creative writing. The series is built on the belief that creative writing should be the unique expression of a child's own feelings, thoughts, and imagination. Creativity, in this sense, is possessed by all children. In a favorable, nurtured environment, these ideas can be expressed in writing. Diversity in form, idea, content, and length is to be encouraged and respected. Creative writing is fun and it is personal. The authors believe that all children have past experiences upon which they can draw in their writing. Children need encouragement to draw

upon these ideas and they need guidance in becoming motivated to write.

To develop their potential capabilities, children must be given the opportunity to think, imagine, and produce creatively. Creative writing is possible given a favorable physical and emotional environment. This series offers abundant opportunities for children to develop their creative abilities.

What: Keys to Understanding Mankind
 Edited by Sandra Nina Kaplan and Jo Ann Butom Kaplan

Published By: Creative Teaching Press
 514 Hermosa Vista Avenue
 Monterey Park, California 91754

How To Order: Order from publisher.
 List price: \$5.95.
 Consumable items: None.

Description: Keys to Understanding Mankind is a set of reading-oriented, open-ended activities. There are 55 Keys that unlock an idea about man in relation to himself and others. Each key idea is followed by a list of activities which guide children in investigating the idea. For each idea there is an illustration which expresses the thinking structure involved in the idea. Some of the key ideas are the following: There is a reason for all behavior; Every issue has two sides; and Courage can be defined.

The directing activities suggest using the characters and elements of stories to demonstrate the ideas and investigate them.

Target Audience: Grades 4-12.

Materials Provided: Fifty-five keys on heavy paper.
 Teacher's Guide.

Teacher's Guide: The kit is introduced by a statement of the objectives of the series. There are suggestions

for the teacher that include an explanation of the use of the cards.

**Subject
Matter and
Teaching
Strategy:**

The Keys may be useful in the classroom as a way of interpreting assigned reading material or as a basis for extra-credit work. A single card could be assigned to one student, to small groups, or to an entire class.

When kept in a learning center, the series could serve as an enrichment program in language arts or social sciences.

Rationale:

Keys to Understanding Mankind is based upon the belief that by encouraging students to investigate and discover, their individual expressive and thinking abilities can be developed and enhanced.

- What:** New Directions in Creativity
Mark I, II, III
- Joseph S. Renzulli, Carolyn M. Callahan
- Published By:** Harper and Row, Publishers, Inc.
School Department
2500 Crawford Avenue
Evanston, Illinois 60201
- How To Order:** Order from publisher.
List price: \$16.00. School price: \$12.00.
Consumable items: Each book contains 48 duplicating masters of activities.
- Description:** New Directions in Creativity is designed to develop the creative thinking skills of children through exercises in divergent thinking. The programs concentrate on improving fluency, flexibility, originality, and elaboration in the context of language arts through making up stories and sentences and working with words in a variety of ways.
- Target Audience:** No rigid grade levels are prescribed, but grades 4 to 8 are the most highly recommended.
- | | |
|--------|---------|
| Mark 1 | Gr. 4-5 |
| Mark 2 | Gr. 5-6 |
| Mark 3 | Gr. 6-7 |
- Materials Provided:** Each level (Mark 1, 2, 3) consists of a book containing a teacher's guide and 48 duplicating masters.
- Teacher's Guide:** The Teacher's Guide presents a description of the history, purpose, and goals of the program. Also included is a summary of some of the theory and research that led to the formulation of the

New Directions in Creativity series. Suggestions for the teacher on how to best use the program's activities and enhance its effects are included.

**Subject
Matter and
Teaching
Strategy:**

Each activity requires a class period to complete, so the program could be used with whole classroom groups in language arts activities. The follow-up suggestions for each activity can be used to extend the material and ideas into other classroom subjects. The program could also be used effectively in an individualized or open classroom.

Rationale:

New Directions in Creativity has been produced in answer to a recognized need for effective, research-based curricular materials for developing children's creativity. The program is based on evidence that all children have potential for creative thought and that the exercise of their creative abilities will result in cognitive growth.

What: Peabody Language Development Kits
 developed by Lloyd M. Dunn and James O. Smith

Published By: American Guidance Service, Inc.
 Publishers' Building
 Circle Pines, Minnesota 55014

How To Order: Order from publisher.
 List price: Complete Kits of Level #P (Mental
 ages 3-5) @ \$145.00
 Complete Kits of Level #1 (Mental
 ages 4½-6½) @ \$52.00
 Complete Kits of Level #2 (Mental
 ages 6-8) @ \$65.00
 Complete Kits of Level #3 (Mental
 ages 7½-9½) @ \$50.00
 Consumable items: None.

Description: The Peabody Language Development Kits are self-contained kits of lessons and materials designed to stimulate overall oral language and creative thinking ability. Each of the four kits consists of 180 carefully-designed and pre-tested lessons that have been proven effective in stimulating oral language development and intellectual processes of slower and disadvantaged children of the primary grades.

The Peabody Language Development Kits lessons are intended to be a supplement to a school's language arts program. The activities do not require reading or writing skills and no seatwork is involved. All children participate together at one time during the lesson activity. The emphasis of each lesson is on thinking, talking, and understanding speech through highly motivating activities.

Each of the four kits is carefully sequenced in terms of difficulty. Brain-storming, problem solving, and similar activities are programmed in each kit to stimulate divergent thinking. Creativity is encouraged throughout the activities. Receptivity is stimulated by "see, hear, and feel" activities. Expression is provided through the "say and do" activities. All the lessons and activities concentrate on the development of cognitive processes involving divergent, convergent, and associative thinking.

Level 2 of the Peabody Language Development Kits, for example, is specifically designed for children whose language ages are in the range of six to eight years. It is especially effective with second grade children who come from economically disadvantaged homes and with first grade children who are intellectually average. It is also appropriate for intermediate trainable retarded children. This level places an increased emphasis on stimulation of cognitive activities.

**Target
Audience:**

Primary grade level, economically disadvantaged, and educable mentally retarded children.

**Materials
Provided:**

Levels 1, 2, and 3 contain each of the following:

Full-color, 7" x 9" stimulus cards provide visual stimulation for many activities. They are especially effective in vocabulary building and in stimulating associative thinking. Level 2, for example, contains 424 stimulus cards arranged in 7 different categories: animal cards, clothing cards, family cards, numbers-in-color cards, occupation cards, shapes-in-color cards, and tool cards.

A set of large "Story" and "I Wonder" full color posters lithographed on heavy plastic paper provide children with stimulating pictures for imagination and continuity in story telling. Level 2 contains 12 "I Wonder" cards presenting pictures which range from the landing of outer spacemen to a bus scene.

A 5" magnetic tape recording contains stories and folk tales, songs and music for introducing and concluding "language time." The recording tape for Level 2 contains two introductory and two concluding songs and eight folk tales--The Boy and the North Wind, Little One Inch, The Ugly Duckling, Mr. Lucky Straw, The Legend of Inchcape Rock, The Story of William Tell, Winter Comes to Babette, and Friends are Like That: Yes They Are.

Level 3 contains four 7" records which provide a number of different sounds and sequence of sounds to stimulate divergent interpretation of auditory stimuli.

Hundreds of plastic color chips are included with each kit. They can be used to teach the colors, groups and shades of colors, color sequencing, and for training memory skills. The chips are interlocking to allow chaining. A major use of the chips is as tokens to reinforce satisfactory performance of the children.

Two hand puppets are included in each kit to focus attention on certain of the activities.

The "teletalk" is an innovation in Level 2. It is a two-way inter-communication device which permits exercises where the children communicate through language alone. The teletalk provides many opportunities for games and imagination.

Teacher's
Guide:

The daily lesson manual contains all the

lessons of oral language and intellectual stimulation that have been developed for that specific kit level. Each lesson gives explicit directions for presenting the various activities. The manual contains general guidelines to follow in presenting the lessons and using the materials. Research and evaluative evidence are also contained in the manual.

**Subject
Matter and
Teaching
Strategy:**

The Peabody Language Development Kits are designed to teach oral language skills. Twenty-four different types of activities are used which do not require reading or writing skills. No seat work is involved. The speech activities range from memory games and guessing games to reasoning games and rhyming games.

Most daily lessons contain an activity that allows free movement on the part of the class. All children participate at the same time. The emphasis is on thinking, talking, and understanding speech. Receptivity, conceptualization and expression are the main linguistic processes stressed. The kits are intended to be a part of a school's total language arts program. They are not intended to replace the regular curriculum.

Creative thinking and imagination are encouraged in activities in which children create

stories, think up unusual uses for objects, and carry on spontaneous conversations.

Rationale :

The Peabody Language Development Kits were designed to stimulate oral language development. By means of auditory, visual and tactual presentation of materials, cognitive processes involving divergent, convergent, and associative thinking are also developed. This development is expressed through various "say and do" activities.

Secondary purposes of the Kits were to develop the verbal intelligence of disadvantaged and retarded children, and thus to enhance their school achievement.

What: The Productive Thinking Program
 Martin V. Covington, Richard S. Crutchfield,
 Lillian Davies, Robert M. Olton

Published By: Charles E. Merrill Publishing Company
 A division of Bell and Howell Company
 1300 Alum Creek Drive
 Columbus, Ohio 43216

How To Order: Order from publisher.
 List price: \$120.00.
 Consumable items: Reply booklets; problem sets workbooks.

Description: The Productive Thinking Program is a suspense-filled learning experience that teaches high-level thinking skills. Students become imaginative detectives and improve their thinking skills by solving mystery cases. Students' participation in the program will result in improvement of the following skills:

- Recognizing puzzling facts
- Asking relevant, information-seeking questions
- Solving problems in new ways
- Generating ideas of high quality
- Evaluating ideas
- Achieving solutions to problems

Target Audience: Grades 5 and 6.

Materials Provided: A 35" x 47" chart of Thinking Guides for classroom display. Fifteen Basic Lesson Booklets in cartoon form. Reply Booklets. They are used with the basic lessons, providing systematic feedback on student responses.

Problem Sets. These are supplementary materials for further extension and strengthening of skills taught in basic lessons.

Teacher's Guide.

Teacher's Guide:

Explains the program, provides administration procedures, discussion of lessons and problem sets, and follow up activities for the teacher.

Subject Matter and Teaching Strategy:

The Productive Thinking Program is an individualized study program for students, with opportunities for group discussion and application of skills learned.

The program fits well into the language arts curriculum with emphasis on reading, writing, analyzing facts, organizing thoughts, and thinking critically. The program can also be integrated into a social studies area. It provides skills in generating ideas, looking at things in new ways, imagining different possibilities, and thinking creatively.

The format of the program adapts well for effective use in learning centers. The exercises also serve as springboards for discussion. Small groups could work as teams and become cooperative case-breakers.

Rationale:

The Productive Thinking Program teaches

children how to think, not what to think. Direct training of thinking skills to develop students' full potential for solution of problems of any nature can be developed. These are generalized skills, underlying all sorts of problem solving. These productive thinking skills are developed using the context of meaningful problems that motivate the student to use his mind in an independent way.

What: The Purdue Creative Thinking Program
 John F. Feldhusen, Susan J. Bahlke, and
 Donald J. Treffinger

Published By: Purdue University
 Audio-Visual Department
 West Lafayette, Indiana 47907

How To Order: John F. Feldhusen, Purdue University
 List price: \$75.00.
 For: Twenty-eight tapes and one set of 3-4
 exercises per tape.
 Consumable items: Exercise worksheets.

Description: The Purdue Creative Thinking Program
 consists of 28 audio-tapes and a set of three or
 four printed exercises for each tape. The taped
 program consists of two parts: a three to four
 minute presentation designed to teach a principle
 or idea for improving creative thinking, and an
 eight to ten minute story about a famous American
 pioneer. The exercises for each program consist
 of printed directions, problems, or questions
 which are designed to provide practice in orig-
 inality, flexibility, fluency, and elaboration
 in thinking.

Target Audience: Grade levels 4, 5, and 6.

Materials Provided: Cassette tapes. Twenty-eight audio-tapes, each
 15 minutes long, giving specific suggestions for
 creative thinking and an historical story nar-
 rated by a professional radio announcer and dra-
 matized with sound effects and background music.
 The program closes with an introduction to the
 first creativity exercise.

Exercise worksheets. A series of three or four creativity exercises accompanies each tape. The exercises are to be duplicated on 8" x 11" paper and distributed to students. One set of exercises for each tape is provided with the initial order.

**Teacher's
Guide:**

A teacher's manual accompanies the program. It gives a brief description and rationale of the program. Written transcripts of the audio tapes are presented along with a statement of the required exercises. General guidelines for the teacher are also provided for help in using the series, along with a set of specific directions for proper administration of the program.

**Subject
Matter and
Teaching
Strategy:**

The content of the audio-tapes focuses on social studies. The series also teaches skills (writing and listening) which would be relevant to the language arts.

The program is designed to be administered in a group setting. It could be easily adapted to an individualized learning center activity.

Rationale:

The program is designed to develop the student's divergent thinking skills. Specifically, the exercises provide training in fluent, flexible, original and elaborative thinking.

These thinking skills increase a child's creative thinking and problem solving ability.

What: The Spice Series
Educational Service, Inc.

Published By: Educational Service, Inc.
P. O. Box 219
Stevensville, Michigan 49127

How To Order: Order from publisher.
List price: \$4.60 per book
Consumable items: duplicating masters \$4.60 each

Description: The Spice Series consists of twelve handbooks of ideas particularly chosen to aid the teacher in motivating student interest in classroom subjects. Each handbook contains directions for preparation, lists of materials needed, and instructions for students for class activities, games, projects, and experiments. Many art and creative writing ideas are presented in the series.

Target Audience: Kindergarten - grade 6.

Materials Provided: Each title in the Spice Series is an individual handbook which may be purchased separately from the others. A list of materials follows.

Spice. A handbook of language arts teaching ideas to be used with kindergarten through fourth grades. The activities, games, and lessons suggested in the book are designed to add interest and motivation to the regular language arts program.

Spice Series Duplicating Masters.
Volume 1: grades kindergarten through two.
Volume 2: grades two through four.

Probe. A handbook of ideas for teaching elementary science. The lesson ideas were chosen to stimulate children to find question-provoking aspects of their environment and search for answers. The handbook emphasizes activity and discovery methods of teaching and learning. Ideas are included to help teachers promote scientific speculation, to help them set up simple experiments, and to help them teach simple concepts by the inquiry method.

Plus. A handbook of ideas for motivating interest in elementary mathematics.

Spark. A handbook of ideas for motivating interest in elementary social studies.

Create. A handbook of ideas for art activities. Using easily found materials, the art activities allow students opportunities to be truly creative with new ideas and to approach old ideas and materials from a new perspective. Many ideas can be adapted for use with language arts, social studies and science projects.

Action. A handbook of ideas for motivating interest in elementary physical education.

Stage. A handbook of ideas which allow students to be creative in dramatic activities. Suggestions are included for choral readings, class plays, pantomime, role-playing, and impromptu skits. Many ideas do not require staging or special materials. Instructions are included to aid teachers in producing more elaborate stage productions requiring scenery, properties, costumes, lights, and sound effects.

Rescue. A handbook of ideas for promoting interest of remedial students in reading.

Anchor. A handbook of ideas for motivating interest in language arts in grades four through eight.

Pride. A handbook of black studies techniques which helps black students develop positive self-concepts and pride, and knowledge of black history, African geography, African animals, and famous black people.

Launch. A handbook of ideas to motivate interest in learning for teachers of preschool and

kindergarten children.

Flair. A handbook of ideas for teachers to use in motivating student interest in creative writing. Writing activities which capture student interest are suggested. Creative writing and poetry forms such as haiku, syo, and diamontes are illustrated.

**Teacher's
Guide:**

Each idea entry in each handbook contains specific directions for carrying out that activity.

**Subject
Matter and
Teaching
Strategy:**

The Spice Series consists of twelve books which cover topics in the elementary school curriculum. Many ideas can be adapted to serve several purposes. Activities in one subject can be designed to correlate with studies in another subject. Teachers will find ideas for enrichment, remediation, total class projects, small group activities, and individual seat-work. Many can be adapted to fit a learning center or a self-instructional format.

Rationale:

The Spice Series is a group of teacher handbooks which provide teachers with suggested activities for creative thinking and practical ideas for making learning fun and interesting for children. They are written from the point-of-view that children are interested in what is

happening in the here and now and not in learning to be prepared for the future.

What: Story Series 3: About Problems Solving

Published By: BFA Educational Media
2211 Michigan Avenue
Santa Monica, California 90404

How To Order: Order from publisher.
List price: \$26.00.
Consumable items: None.

Description: These two stories are concerned with an understanding, affectionate, middle class black family. In the first story Mary Jo, a five year old, overcomes her fears and self-doubts and manages to share something with her class. The concepts the film attempts to teach include: overcoming one's shyness, doing something about it, accepting disappointment in solving difficult problems, trying other solutions and solving one's own problems.

In the second story Mary Jo asks for and gets a puppy. She accepts the responsibility of caring for the puppy and for solving certain problems. The story attempts to get across the concepts of the joy and responsibility of pet care, the care baby animals need, and the duties of the owner.

Target Audience: Primary and lower elementary grades

Materials Provided: One cardboard storage and carrying case
Two film strips
Two records
One teacher's introductory statement

**Teacher's
Guide:**

This is a one-page fold out which gives a synopsis of the film, the concepts being taught, and questions for discussion.

**Subject
Matter and
Teaching
Strategy:**

The stories are primarily intended for language arts and literature. However, they could be adapted to other areas.

The whole class, small groups or individuals can use the material since it is of the sound filmstrip variety. These sound filmstrips would also be useful discussion starters.

Rationale:

These stories are helpful in teaching children that they can solve their own problems. The stories show the importance of taking the responsibility for the solution of one's own problems. This can be seen in the main character's resolve and in her ability to take an active part in the solution of her problems.

What: Story Starters--Intermediate Level
Primary Level

Published By: Creative Teaching Press, Inc.
514 Hermosa Vista Avenue
Monterey Park, California 91754

How To Order: Order from publisher
List price: \$4.95
Consumable items: None

Description: Story Starters brings together 50 illustrated ideas that interest and motivate students to creatively express themselves. Each Story Starter card presents an interesting situation that the child can write about and extend. The subjects that are dealt with are those that are most stimulating and relevant to the experiences and imagination of young children. Many involve adventure and fantasy and require good use of the imagination. Some of the subjects involved are buried treasure, castles, sports, and animals.

Target Audience: Set 1, Intermediate elementary
Set 2, Primary

Materials Provided: Fifty 5" x 8" cards of story starters, accompanying illustrations, and word lists.
Teacher's Guide.
Suggestions to the student.

Teacher's Guide: Each kit includes suggestions for the

teacher on how to use Story Starters. The suggestions describe various set-ups for individual and group use.

**Subject
Matter and
Teaching
Strategy:**

Story Starters may involve an entire class working on one idea at a time. For more individualized situations, a writing center is suggested where students may choose their card and work on it.

Children may also illustrate their stories and present them to the class as a project. For a project, students could dramatize their stories individually or in groups for presentation to other classes, parents, or the teacher.

Rationale:

Story Starters uses a variety of writing experiences to develop children's creative thinking abilities. Children are motivated by using relevant, interesting, and exciting subject matter. The combination of illustrations, ideas, and suggested words provides the motivating force for unlocking their individuality and developing skills.

What: Think-Ins

Sandra Nina Kaplan
Sheila Kunishima Madsen

**Published
By:**

Creative Teaching Press, Inc.
514 Hermosa Vista Avenue
Monterey Park, California 91754

**How
To
Order:**

Order from publisher.
List price: \$6.95
Consumable items: None.

Description:

Think-Ins is a series of 30 task cards that provide ideas and suggestions to stimulate creative thinking and problem solving.

Each card is on a different topic that concerns mankind and his environment, and presents a challenge, things to think about, suggestions for activities, plus ideas for further inquiry. Sample topics are propaganda, education, overpopulation, garbage and health. The problems that are presented in the challenge are to be solved through the processes described in the sections that follow. Hypothesizing, researching, discovering facts, and drawing conclusions are some of the processes that the student practices and should learn from the program.

**Target
Audience:**

Grades 4-12.

**Materials
Provided:**

Thirty task cards made of heavy paper, with the challenge and other sections, and an accompanying photograph.

Teacher's Guide.

Teacher's Guide:

An introduction to the teacher is presented that explains the format and rationale of the set.

Subject Matter and Teaching Strategy:

Each activity is directed towards the individual student, who should consider the problems alone, and work out his or her own solutions. The series can be used in a learning center, for independent studies, and as enrichment activities. The further research section suggests ideas for more in-depth research that could be useful as projects and long-term assignments.

Rationale:

Think-Ins is based on the concept that students should become involved in topical problems, situations, and ideas, and should actively generate their own hypotheses and solutions pertaining to those problems. This process is designed to encourage and develop problem-solving skills and facilitate individual expression.

What: A Total Creativity Program for Individualizing and Humanizing the Learning Process

Frank E. Williams

Published By: Educational Technology Publications
140 Sylvan Avenue
Englewood Cliffs, New Jersey 07632

How To Order: Order from publisher.
List price: \$59.95.
Consumable items: None.

Description: The Total Creativity Program is designed to give teachers the practical help they have been seeking in identifying, encouraging, and assessing children's creative talents in the classroom. It provides classroom teachers, curriculum supervisors, and building principals with assessment and identification measures, teaching strategies, resource listings, lesson plans, posters, and demonstration lesson audio tape cassettes in the area of creativity. Many examples of applied activities for creative thinking and feeling in the elementary school program are offered. A number of activities are suggested for teachers to use in modifying or elaborating on the Total Creativity Program in order to meet their own individual classroom needs.

Target Audience: Kindergarten through upper elementary grades.

Materials Provided: The Total Creativity Program consists of

eleven components which are packaged in a vinyl carrying case:

Volume 1 - Identifying and Measuring Creative Potential. This book presents various observational and assessment measures for the classroom teacher to aid in identifying and measuring the thinking and feeling processes which contribute to creativity.

Volume 2 - Encouraging Creativity Potential. This book offers a repertoire of activities and strategies which can be used to encourage each child's creative potential.

Volume 3 - Teacher's Workbook. This workbook provides teachers and teacher trainers with supplementary instruments, checklists and worksheet exercises for observing and assessing teacher and pupil creative behavior. The checklists and worksheets may be detached and reproduced.

Volume 4 - Media Resource Book. This book offers an extensive listing and classification of books, films, and currently available curriculum materials to teach creative thinking and feeling.

Volume 5 - Classroom Ideas for Encouraging Thinking and Feeling. This book offers over 380 lesson-plan ideas to stimulate creative thinking in a variety of subject areas (i.e. language arts, social studies, science, arithmetic, art-music). The suggested lessons call for processes of inquiry, discovery, and creative problem solving.

Poster Set 1 - Thinking-Feeling Processes. This set of eight black-and-white posters depicts each of the thinking-feeling processes stressed in the Program.

Poster Set 2 - Teaching Strategies. This set of nineteen black-and-white posters depicts each teaching strategy recommended for use in the program. One poster in this set gives an overview of the conceptual model used in the Program.

Teaching Strategies Packet. This packet of nineteen cards describes specific examples of a strategy that can be used to inspire the

creative thinking and feeling of pupils in five subject areas of a curriculum.

Teacher Training Audio Tape Cassettes.
One cassette, entitled "Creativity: A Bridge Between Thinking and Feeling," presents information on the rationale for the teaching of creative thinking and feeling. A second cassette, entitled "Demonstration Lesson," presents actual classroom sessions in which the principles of this program were originally field-tested.

**Teacher's
Guide:**

The Instructor's Manual explains the use and rationale of the materials in the kit, offers a suggested sequence for applying the program and using the kit, and contains instructions for using the demonstration lessons cassette. Transcripts of the "demonstration lessons cassette" are included.

**Subject
Matter and
Teaching
Strategy:**

The Total Creativity Program may be used on a daily basis throughout the school year within the existing curriculum. The teacher is encouraged to select activities or materials from the program to meet specific class needs or interests. The activities and strategies which are offered can be applied to regular classroom practices to encourage thinking and feeling in pupils as they learn regular subject matter (i.e. language arts, science, arithmetic, social studies, art-music).

Rationale:

The Total Creativity Program has been designed around a conceptual model which emphasizes teaching creativity through subject mat-

ter content. This model emphasizes four intellectual behaviors and four feeling behaviors appropriate to productive-divergent thinking: fluent thinking, flexible thinking, original thinking, elaborative thinking and curiosity, risk-taking, complexity, and imagination.

The Program is based upon the rationale that there are mental abilities and emotional capacities of children that are untapped by traditional teaching methods, that these untapped abilities and capacities can be systematically utilized while simultaneously learning subject matter content, and that the most effective means for doing this is through the use of multiple teaching strategies.

What: The Writing Center

Published By: Winston Press
25 Groveland Terrace
Minneapolis, Minnesota 55403

How To Order: Order from publisher.
List price: \$24.00.
Consumable items: Lined writing paper.

Description: The Writing Center is designed to stimulate children's imaginations and provide encouragement for creative writing. The ideas presented in the kit spark imagination and help children develop their writing skills.

Target Audience: Grades 3 through 8.

Materials Provided: The Center includes 49 "Idea Generators," each a thick cardboard sheet (8½" x 10½") with a color illustration or photograph and suggestions for writing about the ideas, objects, or events. The Ideas are categorized into five (5) areas: adventure, mystery, fantasy, animals, and poetry.

Lined paper is also included.

Teacher's Guide: For teacher use, a description of kit objectives with suggestions for use and evaluation is included.

Subject Matter and Teaching Strategy: Each "Idea Generator" can serve as a basis for individual writing and discussion. Children can write their own stories and ideas alone, or participate in group discussion on the illustrations. The Writing Center may be used to its

fullest advantage as a weekly activity.

Rationale:

The Writing Center uses imaginative activities as the basis for developing creative thinking. Through the encouragement and practice in creative writing that is provided by The Writing Center, the child gains experience and confidence in creative production.

Reviews
of
Books

CREATIVE BEHAVIOR GUIDEBOOK

Sidney J. Parnes

1967

List price: \$2.95

How to Order: Charles Scribner's Sons
597 Fifth Avenue
New York, New York 10017

The Creative Behavior Guidebook is a reference source and teaching manual for the development of creative behavior. Teachers at all grade levels will find this book useful.

The book is divided into two sections. The first is concerned with the philosophy and psychology of creative behavior. The second section presents an instructional program for cultivating creative behavior. It offers guidelines for establishing a course in creative problem-solving, and offers examples and lecture material which the teacher can use. An appendix includes a bibliography of research abstracts, audio-visual aids, books, and methods for stimulating creativity, and several articles pertinent to guiding creative behavior. A workbook designed for adult level students is available with the Guidebook.

The Guidebook can be used by teachers at all grade levels, and its basic principles adapted for any classroom. The book is easy to read and well written.

CREATIVE LEARNING AND TEACHING

E. Paul Torrance and R. E. Myers

1970

List price: \$6.95

How to Order: Dodd, Mead, and Company
79 Madison Avenue
New York, New York 10016

This is an exciting book about teaching for creative thinking. Its message is not limited to any particular educational level nor to any particular group of people. It is especially useful to teachers, but can be used by administrators, supervisors, curriculum specialists, and interested laymen. The book attempts to aid teachers by increasing their awareness of their own creative potentialities and by improving their skills of identifying, developing and cultivating the creative abilities of their students.

While theoretical considerations are not neglected, the book is primarily concerned with the things the teacher can do in the classroom to foster creativity. Some examples of what the book offers to the teacher include ways in which the teacher can acquire skills to facilitate creative learning and ways in which the teacher can understand children. Chapters are also included which are concerned with improving the teacher's ability to ask questions, foster a more creative environment, and be more creative. The book also contains sample problems and illustrations of how the material could be used in the classroom.

The authors' personal styles of writing make the book easy to read and easy to use as a source in improving teachers' and students' creative abilities.

CREATIVE MOVEMENT FOR CHILDREN**Jack Wiener and John Lidstone****1969****List price: \$7.95****How to Order: Van Nostrand Reinhold Co.
450 West 33rd Street
New York, NY 10001**

A short skimming of pages in Creative Movement for Children stimulates the desire to take off one's shoes and socks and to create an image through body movement. Excellent photographs of young children and their expression through movement demonstrate well the types of movement a classroom teacher might teach his/her students. The authors emphasize that experience in dance is not necessary for teaching creative movement. Their approach to creative movement for students is expressive, creative, and fun. Included in their description of types of movements and exercises of images is a chart suggesting which movement types are appropriate at each age, five through thirteen.

THE CREATIVE TEACHER: A PRACTICAL GUIDE TO CLASSROOM ACTIVITIES

Grades 1, 2, 3: William Brush, Mary Pat Mullaney, Benny F. Tucker,
and Kathleen Williams

Grades 4, 5, 6: Dolores Albrecht, Sharon Miller, and Nancy Speed

1974

List price: \$3.95 each

How to Order: Milliken Publishing Company
1100 Research Boulevard
St. Louis, Missouri 63132

The Creative Teacher consists of a series of six ideabooks, each specific for a grade from 1 to 6. The activities described, when carried out in the classroom, are intended to reinforce and enrich those skills normally taught at the particular grade level. Activities are oriented toward student involvement in learning, creativity, and open-ended group discussion of the concepts concerned. Each booklet is divided into sections dealing with language, social studies, science, and mathematics. The activities are presented in terms of purpose, necessary materials, procedure, and follow-up. Most materials needed are readily available in the elementary school environment, or are otherwise easily accessible. Some activities require only a few minutes of class time, while others may occupy children for a part or all of the school year.

The series is not designed to replace normal classroom work, but to provide the student with an enriching involvement in supplementary activities. The booklets are very readable, and directions are clear and uncomplicated. The suggested activities require pupils to become actively involved in learning and to think about and discuss what they read and hear. This book should be a valuable aid to the teacher.

PSYCHOLOGY OF PROBLEM SOLVING THEORY & PRACTICE

Gary R. Davis

1973

List price: \$7.95

How to Order: Basic Books, Inc., Publishers
 10 East 53rd Street
 New York, New York 10020

The stimulation of creative thinking is a widely accepted goal of education but one that is not ordinarily thought of in terms of observable attainments. This exciting book clarifies the nature of creative human problem-solving skills and describes reasonable principles for their improvement. Attitudes which promote new ideas are explored, cognitive abilities which contribute to the production of new ideas are identified, and particular techniques which help in the generation of ideas are described. Bionics (the biological-based engineering strategy), idea checklists, metaphorical synectics, attribute listing, and brainstorming are just some of the practical techniques that can be effectively used by the elementary teacher.

Psychology of Problem Solving clearly demonstrates how to develop workable and creative solutions to problems. Well researched creative thinking and problem solving programs such as the Saturday Subway Ride, Thinking Creatively, and Write? Right! are thoroughly described. Information on tests and measures of creativity is provided. Teachers will find this clearly written book a good source of ideas for the systematic teaching of problem-solving and creativity.

PUT YOUR MOTHER ON THE CEILING

Richard DeMille

1973

List price: \$2.25

How to Order: The Viking Press, Inc.
625 Madison Avenue
New York, New York 10022

Put Your Mother on the Ceiling deals with children's imagination games. It is directed towards the preschool, kindergarten, and primary grade levels.

The book is arranged into three sections. The first section gives the rationale of the book; that is, for a child to fully understand reality, he must also understand his own imagination. The middle section focusses on the steps needed to prepare a child for the imagination games. A number of imagination games are found in the final section.

The games actively involve both the child and the teacher. The games are written for a single child, but instructions for adapting them to a larger group are given. The teacher is free to work with an individual child or a group of children. The games are not intended for use with specific curricula, but rather as practical exercises which allow children to explore their own imaginative skills.

The book is clearly written and is easy to read and understand. It will be helpful to any teacher who is interested in improving children's imagination.

SCAMPER

Robert F. Eberle

1971

List price: \$2.00

How to Order: The D.O.K. Publishers, Inc.
771 East Delevan Avenue
Buffalo, New York 14215

Scamper is a booklet which presents games for the development of imagination in elementary school children.

In the introduction, the author explains the theory and rationale and gives directions for "Scampering." A single child, or a group of children, and one adult can play the Scamper games. The teacher presents ideas and cues verbally, and the children are free to explore their own imaginations. The games are designed to increase children's imagination skills, not to develop their skills in a specific subject area.

The theory and directions in the booklet are clearly written and easy to understand. Teachers who wish to increase imaginative abilities and creative skills in their students will find these games helpful.

Chapter 4
Methods of Teaching Creativity and
Problem Solving

Fostering A Creative Classroom Climate

Creativity can be viewed as a process of change in thinking and action. The combination of ideas previously unconnected into a novel idea or concept requires change. In order to foster creativity in your classroom, it is necessary to create an atmosphere that is receptive to change. A positive, reinforcing, accepting climate is the basic ingredient necessary for the nurturance of creative behavior.

By encouraging and reinforcing unusual responses, children's attitudes can be positively directed towards a willingness to think and experiment with new ideas. Continued support and positive attitudes from the teacher are the fuel necessary to power the positive motivational climate that will set the stage for a creative atmosphere. An environment of adaptation to individual pupil's needs and interests, willingness to modify and vary planned activities in the interest and support of the students, and emphasis on divergent thinking skills will result in a warm and spontaneous climate which will spawn creativity in delightful dimensions.

Here are some general suggestions for creating an atmosphere conducive to creative endeavor.

1. Support and reinforce unusual ideas and responses of students.

2. Use failure as a positive to help students realize errors and meet acceptable standards in a supportive atmosphere.
3. Adapt to student interests and ideas in the classroom whenever possible.
4. Allow time for students to think about and develop their creative ideas, not all creativity occurs immediately and spontaneously.
5. Create a climate of mutual respect and acceptance between students and between students and teachers, so that students can share, develop, and learn together and from one another as well as independently.
6. Accept all of the creative products that arise, and be aware of the many facets of creativity besides arts and crafts: verbal responses, written responses both in prose and poetic style, fiction and non-fiction form. Creativity enters all curricular areas and disciplines.
7. Encourage divergent learning activities. Be a resource provider and director.
8. Listen and laugh with students. A warm supportive atmosphere provides freedom and security in exploratory thinking.
9. Allow students to have choices and be a part of the decision making process. Let them have a part in the control of their education and learning experiences.
10. Let everyone get involved, and demonstrate the value of involvement by supporting student's ideas and solutions to problems and projects.

Inquiry, Discovery, Problem Solving and Creativity

Problem solving is the process of recognizing ignorance or inability to act, clarifying the difficulty, seeking further information, generating one or more solutions, trying out a solution, and evaluating the results. The inquiry or discovery approach to learning has been labeled the complete problem solving process. This approach has the unique effect of making a learning experience meaningful to the individual learner.

The process of inquiry begins when individuals question something in their experience. The teacher can manipulate students' learning experience in such a way that they will question. Once they begin to inquire, intrinsic interest takes hold and a learning by discovery process takes place.

There are three phases involved in the inquiry problem solving process. The first is awareness, sensing that a problem exists. This is the motivating factor which arouses the student to go further in defining and resolving a problem. Once the problem is brought into awareness, the problem formulating stage begins. During this phase the problem is defined and ideas arise for plausible solution strategies. It is during this phase that information about the problem is gathered, usually through inquiry behavior such as questions and trial-and-error behavior. The next stage is searching. During this period questioning and information gathering begin to be associated with the formulation of viable hypotheses. Backtracking to reconsider and recapitulate on information may occur in this phase.

When all necessary information has been gathered and a plausible hypothesis has been formulated and tested, problem solvers may feel their problem has been resolved. The answers to inquiry procedures may not always be a product of the same inferences and generalizations, even within the same manipulative situation, for the inquiry process is individualized according to any one individual's questioning pursuits and interests. The inquiry approach is necessarily a divergent thinking technique. Each student will approach the problem with a unique background of experience and focus and direct activities towards goals that are real and meaningful.

Inquiry techniques work well in the classroom in which a warm, open classroom atmosphere prevails. Conditions that foster creativity will also promote inquiry, for students involved in a discovery process must feel free to combine new ideas, ask questions, share their thoughts and reactions, and express their ideas without pressure of peer competition.

Inquiry-discovery teaching is an indirect teaching method. The teacher becomes a guide and facilitator to set students on the road to discovery. The teacher must supply information and materials as students need and inquire about task relevant information. Inquiry learning involves manipulation of the learning environment which is meaningful and relevant to students. A variety of well selected materials can serve to guide students towards the discovery of concepts and principles. Environments in which students are free to choose alternative instructional materials tend to increase inquiry activity.

The use of media is especially appropriate to the introduction of problems and the exploration of ideas and hypotheses which students formulate. Learning centers, for example, provide the necessary freedom of manipulation and availability of materials which inquiry learning requires. Small groups are an excellent means of hypothesis testing and physical manipulation, and role playing is a natural outlet for testing and manipulating social problems and questions.

In all situations, students are actively and meaningfully involved in a personal learning situation. Children will sense problems, ask questions, request and gather information before making decisions when decisions are necessary but no specific problems demand solution. "Inquiry, in essence, is the pursuit of meaning by seeing if one's own ideas about an object, or phenomenon, are substantiated by one's actual experiences with, or observations of it" (Strain, 1970, p. 147).

Creativity is inherently related to the discovery process. Creativity is present in the production of questions and hypotheses, and in the combination of known facts and principles into manipulations of the unknown and development of solution strategies. Experience with discovery learning enhances creative performance by forcing the learner to manipulate the environment and produce new ideas.

The learner must be flexible to examine alternative solution strategies and hypotheses, and must elaborate and define needs in the quest for information. All of the creative processes, fluency,

flexibility, elaboration, and originality are thus incorporated in the discovery-inquiry problem solving process.

The basic considerations to be met in an inquiry learning experience are:

1. Provide the initial experience to interest students in inquiring about a problem, concept, situation, or idea. The use of media, role-playing, and demonstrations are generally successful investigative starters. Learning centers which place the student in a problem situation with a number of viable options are an excellent beginning.
2. Provide the students with manipulative situations and materials to begin avenues of exploration. Games, media, files, sourcebooks, and discussions are all good starters.
3. Supply information sources for students' question. Outside sources, fieldtrips, speakers, peers, and the teacher are worthy supplements to written sources. The community and the world at large are fair game in the information seeking stage.
4. Provide materials and equipment that will spark and encourage student experimentation and production.
5. Provide time for students to manipulate, discuss, experiment, fail, and succeed.
6. Provide guidance, reassurance, and reinforcement for students' ideas and hypothesis.

Expecting the Unexpected: Questioning Techniques

In order to help children become good thinkers, we need to give them something to think about. The most common method of

getting children to think is to ask questions. However, asking questions that require children to think requires much more thought and preparation by the teacher than asking questions which have one correct response. Convergent questions that have one right answer are useful in evaluating the learning of information, but they require few thinking skills on either the part of the teacher or the learner.

Questions which facilitate creative thinking are divergent or open-ended questions. These questions are often the springboard for a discussion, having a number of possible answers.

Divergent questions can provide access to all of the cognitive skills children need to acquire. Questions can be asked at all thinking levels and abilities. Higher level questions (analysis and evaluation) produce better evaluative skills than do the questions on lower levels. Questioning divergently helps children develop skills in gathering facts, formulating hypotheses, and testing their information.

Here are some guidelines to follow in developing your own questioning techniques.

1. Prepare questions before a lesson. Use the Guilford Structuring of Intellect operations or the Bloom Taxonomy (Cognitive Domain) as a guide.
2. Ask questions simply and directly and avoid excessive wording. Vary the way you word questions. Ask questions which stimulate students' creative thinking processes (comparison, just suppose, interpretation, criticism, etc.).

3. Use some simple information questions to break the ice and to induce student participation, particularly for children who are fearful about responding to thought questions.
4. Allow sufficient time, after a question is asked, for children to think and to formulate possible answers or responses. Avoid calling on the first student whose hand is up.
5. Reinforce and encourage all children's efforts to respond even though their contributions might be wrong. If a child's response is incorrect, offer a correction or call for a response from another child, but try to avoid any sense of ridicule or "put down" of the child whose response was wrong.

Here are some illustrative questions based on our concepts of fluency, flexibility, and originality for a lesson on the Pony Express:

Fluency: What are all the ways mail might have been transported across the United States at that time?

Flexibility: Most of the time we think of the horse as a means of transportation for the rider and mail. Can you think of other ways a horse could have been used to communicate information from one place to another?

Originality: Can you think of some very unusual way that no one else has thought of to transport mail today?

Critical Thinking

There is more to thinking than meets the ear. The ability to give the right answer to a question may or may not be a significant accomplishment, depending on the thought processes that took place before the answer surfaced. Critical thinking involves evaluation and consideration of the information available to the thinker. Critical thinking involves creative thinking because it requires the thinker to assimilate information and hypothesize solutions to problems.

Five basic steps are employed in the critical thinking process:

1. Recognizing problems
2. Formulating a hypothesis
3. Gathering pertinent facts or data
4. Testing the hypothesis
5. Drawing conclusions

Classroom activities can be geared to developing critical thinking in children. Instruction must be organized in such a way that children are supplied background information and allowed to manipulate the information and discuss problems in order to discover their own conclusions. By learning to think critically, children learn to utilize and incorporate their acquired knowledge in a cumulative and productive manner.

Questioning and discussion sessions which employ divergent questioning techniques are facilitative of critical thinking. Children who are critical thinkers also need to be questioning learners. Situational learning which provides information but

causes a child to seek information rather than to simply process given information will aid in the development of critical thinking. Learning by doing, role playing, solving cases and problems, and experimentation are situational learning experiences. Simulations are also excellent ways to actively involve students in a learning situation and to induce and teach critical thinking.

Brainstorming

Brainstorming is a technique used to produce ideas related to a particular problem, topic or theme. It is an excellent technique for strengthening imagination, flexibility, and discussion techniques. It is also a highly successful tool for problem solving that can be conveniently used in nearly every subject area and situation.

You will need recorders to take down all responses. If the recorders are using pen and pencil, two work better than one since the ideas sometimes come fast and heavy. A tape-recorder is a good backup device to make sure no ideas are missed. It is also good to put all ideas on the blackboard because then they are available for all to see.

It is a good idea to gather all participants into a circle if possible, but normal classroom seating in rows will also be suitable. You will want to announce the topic well before the actual brainstorming session to allow children to think about the topic a while before the brainstorming session. When the session begins the topic should be restated and children should be told the ground rules: 1) all ideas are accepted, don't evaluate, 2) try

to get as many ideas as possible, 3) be open to combinations of ideas, and 4) don't be afraid to give silly or wild ideas.

Participants should be allowed to express their ideas as they come, but one at a time so that all ideas are recorded. Hitchhiking is welcomed, that is, if one participant gleans an idea from another's idea, he/she should be allowed to give the new response immediately. Combining two or more responses is acceptable and encouraged.

The secret to brainstorming is deferred judgment. This means that criticism is ruled out. All responses are accepted and evaluation (good or bad) is withheld until later. Some teachers like to keep a bell or buzzer handy to use as a warning signal that someone is criticizing or evaluating. Freewheeling is also welcomed. Wild, bizarre ideas are welcomed.

In brainstorming, the emphasis should be on quantity. Quality implies evaluation, which comes after the brainstorming session. Quantity is important. The larger the number of ideas produced, the more likely that many of them will be useful ones. The ideas generated tend to get more original as the session continues. Common ideas will be generated at first, then participants begin to stretch their minds for unusual responses as the more obvious responses are offered.

After the session is over, members should be provided with a typed copy listing all the ideas generated. This can be used for further exploration, combination of ideas, and final selection of potentially useful ideas. Evaluation and selection of ideas to

be implemented or developed should come from each member or from a select committee after the brainstorming session. It is often a good idea to have a postsession request for late ideas and thoughts. Then children can be assigned to project work groups to plan, elaborate, develop, and implement the ideas.

The topic for brainstorming should cover the problem statement but be broad enough to allow for freedom of thought. For example, when brainstorming for a unit on the family in social studies class, the question might be, "What are all the ways families could increase cohesiveness and togetherness?" For a unit on Japan, the question might be, "What are all the things we would like to learn about Japan?" In both instances, the ideas generated would be used as the foundations for developing other learning activities.

Brainstorming can be used in almost any area of the curriculum. Students can also be given problems in classroom planning and management (how to solve a trying discipline problem, things to be done in planning for a forthcoming field trip). In all instances brainstorming sessions should be followed by an evaluation session in which the best or most promising ideas are identified and plans are made for individuals or small groups to work on developing, elaborating, and implementing them.

Attribute Listing

The combination or modification of old ideas, concepts, and principles into new and novel ones is the basic premise behind creative thinking. Attribute listing is a technique that promotes

a clearer view of the qualities, specifications, characteristics, limitations, and attributes of a problem to allow for easy change and the development of new ideas through the change.

Paper and pencil, chalkboard, transparency material, and an overhead projector are the main items of equipment needed. Attribute listing can be done by individual children or combined with informal brainstorming in group work.

The teacher can begin an attribute listing group project by defining the problem and writing it where it is readily visible to all the children. Then a chart such as appears in Figure 4-1 should be developed. In column form, three lists should be developed. In the first column, the problem is broken down into parts or components. In column two, the characteristics or attributes of each part are listed. In column three, ideas for improvement, based on ideas generated in columns one and two, are written.

After the ideas have been developed and listed they can be easily examined, discussed, and elaborated upon. If they pass the evaluator and receive approval from the group, the final step is implementation and resulting modification or solution of the problem.

Attribute listing can be used as a springboard for stimulating class discussions. The possibilities are endless. Social studies discussions, discussion of scientific principles and problems, character studies and story writing and discussions, and problem solving are some suggested areas in which attribute listing can be used.

Figure 4-1

Problem: How To Improve The Playground

Part or Component	Characteristics or Attribute	Ideas for Improvement
1. The ground surface	1. Grass Blacktop Concrete	1. Need more grass Use artificial turf
2. The placement of play equipment	2. In rows Close together	2. Vary placement Spread out Make game area
3. The baseball diamond	3. At far corner On dirt area	3. Put in grass Stationary bases
4. The swings	4. Very tall Metal chain Wooden seats	4. Need small ones Belt seats better
5. The water fountains	5. One fountain Made of concrete	5. Need more fountains Needs steps
6. The fence around it	6. Very high Chain link Blocks vision	6. Make it lower More open

Attribute listing could take place in large class discussions, in small group work, or individually. One idea is to supply handouts with column one already filled in. Attribute listing is a useful technique for developing new ideas.

Morphological Analysis

This technique involves the analysis of two or three components, specifications, or characteristics common to a particular problem situation or object. While attribute listing focuses on the modification principle of creative thinking, morphological analysis focuses on the combination principle, combining old ideas to produce novel ideas.

Morphological analysis involves the use of a grid system (See Figure 4-2). For easiest implementation of this technique, construct the grid (either two or three dimensions) on a chalkboard or transparency and on individual handout sheets.

Like attribute listing, morphological analysis can be an individual thinking activity or combined with informal brainstorming as a group activity. The following steps are to be used, along with Figure 4-2 as an illustration:

1. Write the problem statement at the top of the matrix.
In our illustration it is stated as follows: Improving the classroom environment using common materials and available equipment.
2. On the horizontal axis of the grid, list all of the types of things that are relevant to the problem. For example, one characteristic of the problem illustrated in Figure 4-2 is the parts of the classroom environment. Brain-

Figure 4-2

**Problem: Improving the Classroom Environment
Using Common Materials and Available Equipment**

Components					
Materials	Floors	Walls	Desks	Tables	Chalk boards
Paper	Paper footprints to guide movement	Murals for walls	Paper desk pads for scratch paper work		
Cardboard	Use large pieces of cardboard as room dividers	Partitions study carrels	Use Tri-wall cardboard to build desks	Put cardboard boxes on tables for storage	Could get more black boards painting black on cardboard
Felt/Cloth	Bring in scraps to sew together to make a classroom carpet	Put up felt/burlap strips for display purposes	Make cushions for desk chairs		
Paint		May not be possible to do in some schools	Let each child decorate desk	Have color-coded tables for learning stations	Slate paint on walls, ceiling boards
Rubber	Old tires for sitting in				
Glass		Partitions to cut sound and noise down		Glass tops to lay over desks and tables with instructions underneath	
Plastic		Egg carton wall partitions good acoustic devices			

storming may be used here to gather all of the varieties and types of specific characteristics.

3. On the vertical axis of the grid, repeat the same procedure using another characteristic. In our illustration, we used types of materials.
4. Combine the two characteristics to fill the cells. Some cells cannot be filled because they represent impossible combinations. Others lead to good ideas.
5. Evaluate the cell combinations and plan strategies for solution of the problem or development of the new product.

Morphological analysis is a formal way of bringing ideas together into combinations which might be useful in solving a problem or improving some things or situations. It requires clear explanations from the teacher concerning what is expected from the children and how to do it.

Synectics

Synectics is a process whereby analogies are used in problem analysis. There are three types of analogies popular for use in synectics: (1) fantasy, (2) direct, and (3) personal. The use of fantasy analogies is the most common and is usually the lead off in a synectics session. In fantasy analogies children search for the ideal solutions to a problem but their solutions can be as farfetched or unusual as possible. Solutions may be dreamed up in fanciful, whimsical, even animated dimensions. The teacher may start off a session by asking the children to think up the ideal solution for a problem involving movement of a heavy piece

of equipment on the playground. Analogies may be fantasized that include tiny nymph-like creatures carrying the equipment skyward, use of elephants, or giant balloons. These solutions are later forced into practical analysis for the design and solution of problems.

Another popular form of analogy is the direct analogy. Using this technique, synectics group members are asked to find parallel problem situations in real life situations. For example, moving heavy objects may be paralleled in real life situations by animals transporting their young. Spaceships carrying space exploration equipment would also be a sample of the same problem situation in another setting. The main difference between fantasy and direct analogy procedures is that fantasy analogies can be entirely fictitious, whereas direct analogies must be actual parallels in real life to the problem.

Personal analogies bring an element of fantasy into the synectics session by placing participants in the role of the problem itself. In a personal analogy approach the problem solves itself. The thinker might begin by saying "If I were a heavy swing set on the playground and I wanted to move to another place on the playground, what could I do?"

Synectics is a fun way to involve students in imaginative discussions and come up with unusual and workable problem strategies. Any subject related topic can be examined in small or large group discussions. Giving students an explanation of the method to be used and examples will help stimulate an effective

synectics session. Through synectics children can learn valuable strategies for solving problems.

Forced Relationships

The technique of forcing relationships is a strengthening activity which helps develop the ability to see unusual uses for things and the combination of ideas from different viewpoints. The technique has four major approaches which will be summarized below. These are listing techniques, catalog techniques, focused relationships, and arbitrary forced relationships.

Listing Techniques

In this technique the problem statement is presented to the thinkers. A list of unrelated objects is then presented, or generated by the teacher or thinkers. This list has no relationship to the problem stated and may, in fact, be produced before the introduction of the problem in order to lessen the tendency to choose related objects. The thinker must take each object on the list, in turn, and associate it with the problem statement. The objects themselves do not need to be related. The relationship should be derived by a free association method, that is, taking the first relationship is initially deferred. After all relationships have been recorded, the children go back through the list and evaluate the ideas for possible modification, development, and implementation. Evaluation of the responses should be recorded with a + or -. A third run through the responses serves as a planning stage to begin development of the ideas.

Here is an example of a forced relationship technique used

to deal with the problem "Fighting on the Playground."

<u>List</u>	<u>Freely Associated Responses</u>
+ magazine	Take magazines to playground for diversion of fighters.
+ grass	If they must fight, grass is better than blacktop, so plant grass.
- oil	Oil shoes of the fighters so they can't stand up.
- shoe	Make the fighters go barefoot in warm weather. Blacktop and gravel will hurt feet and prevent fighting.
+ puzzles	Give children puzzles to solve to calm them down.
+ ice	Use ice cream to reward good behavior.
+ typewriter	Let children type to reward good behavior.

Catalog Techniques

This technique is much like the listing technique. The problem is stated first. However, objects to be used in association with problem solutions are drawn randomly from a catalog. The catalog is opened at random and the child can use any object he sees there in creating a solution. The objects are then forced to fit the problem statement. The same steps of evaluation, development and implementation are then followed as in listing.

Focused Relationships

Focusing relationships follows the same lines as the catalog or listing techniques. However, the relationship of the objects to the problem statement is not completely random or arbitrary. The objects which will be forced to the problem statement should be pre-selected and in some way be relevant to the problem. For

example, in the problem "Fighting on the Playground," typewriter would not be selected as a forceable object, but grass and shoe might be. Playground equipment, boxing gloves, rocks, and black-top, would be relevant to the problem. As with the other techniques, the relationship of the objects to the problem are freely associated, one at a time. Evaluation is held off until all of the relationships have been created. Then development and implementation of the ideas is undertaken.

Arbitrary Forced Relationships

Arbitrary forced relationships do not involve the use of a problem statement. All that is needed are a group of arbitrary words, objects, or ideas. Two objects are selected at random and forced together. Ideas that are produced using this technique can then be developed. One good method of presentation is to fill a fish bowl with objects written on folded slips of paper. The thinker must pull out two slips, read the names of the objects, and force them together to create a novel idea. One published source for this technique is the Think Tank, developed by Savo Bojici.

Summary

These various methods and techniques for teaching creative thinking, problem solving, inquiry, and critical thinking can be incorporated into the regular classroom subject matter or they can be organized as separate experiences. If they are related to subject matter, they will enhance both subject matter learning

and the acquisition of skills in creative thinking and problem solving. It is important to remember that in using any of these methods, the goal is not to solve problems as such. Rather it is to help children develop their abilities to solve many kinds of problems in and out of school.

Chapter 5

How To Get A Project Started In Your Classroom

Now that you have had an opportunity to explore some of the methods and materials that are available for you to use in your classroom, you will probably be anxious to get started on a project of your own. Perhaps you have already been working on some activities for helping children think creatively, and have located some promising new methods and materials to include. On the other hand, teaching for creative thinking and problem solving may represent a new direction that you're interested in trying out in your own teaching. Either way, by now you may be wondering how to get started. This Chapter will give you some useful ideas and suggestions.

Six General Guidelines

Your efforts at helping children become better creative thinkers and problem solvers will be more successful and more rewarding for you and your students if you approach your goal very systematically. There are six general guidelines which will help planning, conducting, and evaluating your classroom project. They are:

1. Know what creative thinking and problem solving are as processes and abilities.
2. Determine what processes, skills, and content you want the students in your class to learn and develop.
3. Try out your plans and new ideas before you begin to use them with your class.

4. Create an atmosphere in your class in which creative learning can occur.
5. Utilize learning procedures involving many activities and products.
6. Conduct a careful review and evaluation, not only of the students' learning, but of your own project and efforts, and plan revisions accordingly.

Of course, there are many specific ideas and suggestions that will be useful to you in your efforts to implement these general guidelines. In this Chapter, these guidelines are discussed more specifically. Hazards and pitfalls you must be prepared to deal with during your project are pointed out, and some suggestions about opportunities for you to locate demonstration projects and displays of useful resources and material are provided.

1. Be certain that you understand the creative thinking and problem solving abilities you hope to foster.

What are the components of the problem solving process? In order to teach students to think well, one must understand the process of problem solving. Sidney Parnes (1967) defines five stages of the creative problem solving process: (1) fact finding, (2) problem finding, (3) idea finding, (4) solution finding, and (5) acceptance finding. Let's examine each of these stages.

Fact-Finding involves using all of the information available about the problem.

The problem solver must first examine all of the available information about his problem, much like Sherlock Holmes. Before

a problem can be solved, it must first arise. The discovery of the problem is the first major step involved in problem solving.

Like a sleuth, the thinker must become aware of any and every particle of information that might help to define the elusive problem. Once all information is collected, and the clues to the problem are laid out, the task of problem-finding and problem definition presents itself. In this stage, children are like a sponge. They absorb information about the components of the problem. When thoroughly saturated, they can evoke a broader restatement of the problem. By wringing information out of the sponge and soaking it back up several times, children can analyze each element in the problem, arrange and rearrange the problem statement, and define the objectives of the problem. Finally, the problem may be broken down into sub-problems, and each component of the sub-problems analyzed for available information.

Once the problem has been adequately defined, and all information about the problem and the problem situation has been identified, the task evolves into the generation of ideas and alternative solutions to the problem. Idea-Finding is the generation and manipulation of ideas. Chapter Four describes a number of methods and strategies that can be used to help produce responses in the idea-finding stage. Among these are brainstorming, check-listing, attribute listing, and morphological analysis. There are four major rules that apply to all of these methods, and to the whole concept of idea finding:

- (1) Do not criticize or evaluate any ideas produced.

Ideas should be free-flowing and unhampered at this stage.

- (2) The crazier, the better. Wild, imaginative ideas may become practical when forced into problem situations from a different viewpoint. The emergence of an unusual or bizarre idea may spark yet another, and perhaps usable, idea in fellow problem solvers.
- (3) The more the merrier. Quantity of ideas is important in the idea-finding stage. Quality of ideas is not considered at this point. The more ideas there are, the greater the base for evaluating and selecting viable ideas becomes.
- (4) Work with others in the combination of ideas. No one person's idea belongs to that person; all ideas at this stage are thrown into the communal pot. Ideas that sprout from other ideas that have been suggested are fair game.

After a considerable list of ideas has been formulated, the best and most practical or desirable idea to solve the problem must be sought. Herein lies the basis of the Solution-Finding stage in problem solving. Solution finding is the evaluation of ideas produced in the idea-finding stage, and the manipulation of the best idea into a solution strategy. Now is the time for consideration and discussion of each idea that was produced. Criticism may indeed occur here, along with speculation and elaboration about possible ways to implement an idea.

In the final analysis, the best idea may often turn out to be an unconventional idea, or one that may involve radical change.

The final step in the creative problem solving process becomes acceptance finding. This merely suggests that a final consideration be made of the solution in order to implement the idea into a solution strategy.

Now you are aware of the stages a problem solver goes through in dealing with a problem. It is also important to understand the thought processes involved in these stages. There are four basic abilities involved in creative thinking. These are fluency, flexibility, elaboration, and originality.

Fluency is a memory process. An individual gathers and stores information in his mind until it can be of use. The ability to recall information so that it can be used in the solution of a problem is a fluency process. Fluency can be observed in a class discussion when a pupil offers many ideas on one topic, or produces several ideas for the implementation of another individual's idea. Fluency is an important aspect of any idea generating component. A student who provides many responses in an idea producing session is illustrating fluency ability.

Flexibility is the ability to switch from one train of thought to another. In problem solving and creativity, individuals must be able to see a wide variety of applications to a particular concept. Flexibility requires the ability to adapt to alternative new situations and ideas. It also means not getting locked into particular or rigid ways of viewing the problem. Flexible thinkers can use information in a variety of ways. Flexibility can be observed in a class discussion when a pupil switches easily from one

topic to another and incorporates several alternatives to each problem presented. A student who gets stuck on one idea, or who cannot relate his/her ideas to other pupils' ideas, is not being flexible. Flexibility is directly related to the problem solving processes. When you are defining a problem, you need to look for all of the possible alternatives which might be involved. If you get stuck on an alternative solution that is not the right definition, the best solution may never surface.

Originality is the ability to produce new, unique, or unusual ideas. Original thinking welcomes the strange and bizarre. Oftentimes, unusual ideas are the combination of two old ideas in a new dimension. The invention of the water bed may have originated from someone's desire to float off to sleep. Originality can be strengthened in students. Practice in trying to be original, acceptance of unusual ideas, and encouragement for students to go out on a limb and dream up kooky ideas are several approaches to the development of this important ability.

Elaboration is the ability to fill out an idea, to add details, and to build up groups of related ideas. Once an idea has been formulated, an individual must be able to bring it to fruition. Elaboration is also important in the fact-finding stage. Once you define an element of the problem, you must be able to clarify and elaborate on how it relates to the conditions of the problem.

These basic processes that have been presented so far in the chapter should be clearly understood before the teacher proceeds further in developing instructional material to teach creative thinking and problem solving.

2. Determine what processes, skills, and content you want the students in your class to learn and develop.

The important steps to remember in this goal have to do with developing goal statements and instructional objectives. Some teachers do not believe it is necessary or important to prepare specific instructional objectives. However, planning goals and objectives is an important step in preparing instruction which will effectively foster creative thinking and problem solving.

The development of objectives which contribute to your efforts to foster creative thinking takes into account the content (or subject matter) that will be taught. You should also deliberately consider the processes and abilities in creative thinking and problem solving, however, and check to insure that you have written objectives which involve the use of those processes and abilities. Some examples of statements of objectives which involve creative thinking abilities and problem solving processes have been provided by Covington, Crutchfield, Davies, and Olton (1972) in the Teacher's Guide for the Productive Thinking Program. Their summary of the skills of productive thinking includes:

Recognizing puzzling facts

Asking relevant, information-seeking questions

Solving problems in new ways

Generating ideas of high quality

Evaluating ideas

Achieving solutions to problems

In planning what will be taught, it is also recommended that you

can help encourage creative thinking and problem solving by involving students in making choices and in planning what will be learned. One way to do this is by planning several alternative learning activities, among which the students can choose, for each of your instructional objectives. If you wish to provide the students with an even greater role in planning, you can use class meetings at the beginning of a teaching unit or on a daily basis, at which time the students and the teacher can plan together. This approach is very effectively supplemented, too, by having another class meeting at the end of the day or unit, in which everyone reviews the progress that has been made and evaluates the extent to which the plans made earlier have been completed. Eventually, of course, the students can be brought into the planning process on an individual basis, through the use of contracts or learning agreements.

As you begin planning a project for developing creative thinking, you should also devote considerable energy to reviewing and selecting useful methods and materials. One source of guidance for task and method selection is figure 5-1. This chart provides a description of various tasks which promote development in a specific problem solving area. As you plan your project, a quick glance at the chart will point you in the direction of appropriate activities and tasks. You can use this information by looking to the methods and materials available and choosing the materials that utilize the necessary types of activities for your purposes. The task chart is also a helpful tool when you are constructing or devising your own teaching

Figure 5-1

Problem Awareness and Information Gathering: Sensitivity and awareness to problems. The discovery of problem situations and problem definitions. (Organizing available data, asking, questions, classifying and utilizing information.)

<u>Type of Task</u>	<u>Examples of Task Activities</u>
Improvement	1. Product improvement--how could you make this product better. 2. Situation improvement--how could you change this situation, environmental improvement, etc.
"What If" Situations	1. "Just Suppose" imagination activities. Story completion activities. Prediction of consequences.
Observation Activities	1. Finding camouflaged or hidden figures. Scrambled word games, word finding puzzles. 2. Clue finding, information hunting in stories. 3. Problem definition. Defining a problem from a mass of information.
Questioning and Speculation	1. Speculating on what is occurring in a picture or part of a story. 2. Writing newspaper headlines and story titles for pictures. 3. Completing pictures and designs from abstract or symbol line beginnings. 4. Solving riddles and puzzles.

Figure 5-1 Cont.

Idea Production and Formation of Hypothesis: Thinking up ideas, finding ideas from available information and constructing hypotheses for problem solutions.

<u>Type of Task</u>	<u>Examples of Task Activities</u>
Ideational Fluency	1. Thinking up unusual uses for things, writing as much as possible about absurd topics. 2. Writing similes, synonyms and antonyms for words and phrases. 3. Categorizing--List all of the things you can think of that are cylindrical in shape.
Flexibility	1. Find a variety of uses for common objects. 2. Make several drawings from line beginnings. Design symbols for words or ideas. 3. Indicate subtle changes in phraseology, figural drawings, or visual demonstrations. (Find the figure that is different, where did the change occur, etc.) 4. Find several solutions to physical puzzles (match stick puzzles, block puzzles, word puzzles.) 5. Story problems--what endings might this story have, etc.
Improvement	1. Product improvement--how could you make this product better. 2. Situation Improvement--how could you change this situation, environmental improvement, etc.
"What If Situations"	1. "Just Suppose" imagination activities. Story completion activities. Prediction of consequences.

Figure 5-1 Cont.

Evaluation and Hypothesis Testing: Making judgments about ideas and hypotheses previously formulated. Experimenting to test ideas. Generalizing consequences and results. Improving viable ideas, and checking hypotheses against the facts.

<u>Type of Task</u>	<u>Examples of Task Activities</u>
Elaboration	1. Adding details to drawings, designs, stories, or ideas. 2. Filling in outlines.
Associational Fluency	1. Writing synonyms and antonyms for words. 2. Producing lists of words that are associated with other words.
"What If" Situations	1. "Just suppose" imagination activities. Story completion activities. Prediction of consequences.
Experimentation	1. Manipulation of facts and actual trial of hypotheses through physical experimentation, simulated activities and games, role playing, etc.

materials.

Using Published Material

One early decision to make involves the extent to which you will utilize published materials, such as those reviewed in Chapter 3, in your project. The reviews in Chapter 3 will give you enough information to make a tentative selection of suitable materials. If you locate some published materials that seem to be appropriate for your project, you can arrange to order the material through your school's usual channels. (The information provided in the Reviews may be helpful to your principal or supply coordinator in ordering the material.)

When the material arrives, scan the whole set to familiarize yourself with the kit or set. Then begin your intensive study in the teacher's guide or manual. The manual usually begins with a description of the purpose or objectives of material, and gives full instructions concerning how to use the kit. You should become thoroughly familiar with the various materials in the kit. Developers of materials often use special terminology when describing their materials. Thus it is imperative that you become familiar with each piece of material being described. This can be accomplished by handling and examining each piece of material as it is being discussed in the teacher's guide.

It is also important to read the complete description of how the material should be used. Some teachers who are highly competent in using traditional instructional material assume that they can bypass much of this material in the teacher's guide or manual. However, much traditional material assumes a completely different teaching strategy which stresses presentation and ex-

planation by the teacher. Creativity and problem solving instructional materials assume little presentation or explanation and much stimulation of independent thinking. Because of this special nature of creativity materials, a thorough understanding of how to use the material to stimulate creative thinking and problem solving is necessary for maximum effectiveness.

The teacher's guide may also describe work that can be done to follow up the work in the kit being used or other sources that will enhance the kit. Clearly, the teacher's guide is a valuable source in which one may find, not only the way in which the kit can be used, but also ways in which auxiliary material or follow up work can be added to the classroom.

Using Methods

You may be interested in utilizing some of the methods for stimulating creative thinking, which were reviewed in Chapter 4. These methods can be useful in your project, whether you decide to make them the principal part of your efforts or whether you incorporate them into a program which also involves the use of published material.

After you have read Chapter 4 and identified some of the methods for possible incorporation in your project, you should plan to devote some additional time to preparation, since you will not have a teacher's manual or ready-made material for the pupils. It is important, of course, that you understand the use and limitations of the method. You may

find it valuable to consult additional background references from Chapter 4 for any method you plan to try out, since each one involves specific techniques that must be quite clear to you before you will be able to use the method successfully.

When you feel confident that you understand the method, you should give yourself plenty of time to plan ways for "building" the method into your instructional plans.

Sometimes the method will be valuable to you in the planning stages of instruction. For example, brainstorming can be used with your class to plan the content of a unit or lesson (as was illustrated in Chapter 4). Alternatively, the methods may also be used in developing learning activities for the children, whether individually, in small groups, or with the entire class. Thus, you can use the methods described in Chapter 4 to plan instruction, as well as to provide a basis for learning activities to include in any lesson or unit plan you develop.

3. Try out your plans and new ideas before you begin to use them with your class.

It is likely that most teachers benefit from a trial run through the material as it would be used in the classroom before beginning their actual instruction. While it might seem laborious, this trial use of the material will yield substantial dividends. By doing this you will determine whether you really know how to use the material. Secondly, it allows for teacher anticipation. You have the prized and unmatched vantage point of knowing the needs, desires, problems, abilities, and interests of your students. With that information, plus thorough familiarity with

the materials, you can be prepared for questions the students might raise and be able to direct them to follow up activities. Great benefits can be gained if the teacher is able to direct students to additional sources or activities when their interest or motivation is high. Furthermore, the teacher can be prepared for the various problems that may arise while conducting the project in the classroom. These problems can range from the need for special equipment to inadequate time allocations for specific activities. These problems are easily eliminated by careful advance planning.

A trial run can be particularly useful if you are part of a "team teaching" program, or if you can identify one or more of your colleagues with whom you can share your ideas and plans. If at least two teachers share an interest in a creative thinking project, there will be many opportunities for the kind of sharing or "cross-fertilization" of ideas that is valuable in creative teaching and learning.

Finally, the trial run may be especially valuable if you are trying out a new method from Chapter 4, since it will provide you with an opportunity to verify your own personal understanding of the method and your ability to use it in your own thinking. You will be much more enthusiastic, probably, if you have had opportunities to put the method to use yourself before you begin to use it with your class.

4. Create an environment in your class in which creative learning can occur.

Creative learning does not just happen by chance, and while occasionally it might result from a "happy accident," one should

not be satisfied with a project that depends upon luck. In addition, no amount of careful preplanning can reduce the importance of what happens in the classroom when the project actually begins. Every teacher has doubtlessly known the experience of the very carefully planned lesson that falls flat on its face. Fortunately, there are many things you can do to help prevent the fates from determining the success of your project in the classroom. Some of these things are described next under the general category of the "classroom atmosphere" you establish for creative learning.

Warm-up

Before beginning a lesson or activity the teacher should attempt to "warm up" the class. Even the greatest lesson plan will not be effective unless it includes some strategy for establishing a receptive psychological set among the students. One effective way of accomplishing this is by using open-ended questions which arouse interest or stimulate curiosity. Another effective approach is to utilize a puzzling phenomenon or problem to stimulate the students to ask their own questions. Many teachers give thought to asking different questions, but never think of the possibility of beginning instruction with spontaneous student questions (cf., Torrance & Myers, 1970).

Physical arrangements

One important way of establishing a classroom atmosphere for creative learning is through careful attention to the physical arrangements of the classroom. For example, to use buzz groups effectively, it is necessary to seat small groups of students

in circles. In some cases it might be helpful to push the desks aside and have the students sit on the floor. A brainstorming group can be as large as eight to ten students, while other kinds of group discussions, presentations, and demonstration projects may be best suited for an entire class.

If you are using an individualized approach in your project, you will probably also discover that you need to designate various parts of your classroom (or even other near-by rooms if they are available) for a number of individual and group activities throughout the day. If your room is large enough, you may well find it useful to use moveable dividers, portable chalk or bulletin boards, tables, or even home-made wooden or cardboard dividers to partition the room off into various activity areas. It is also worthwhile to include a special area for quiet relaxation and thinking; creative ideas often require a quiet period of time for "incubation."

Physical activity and productive noise

You must also keep in mind that many creative learning activities involve a greater degree of physical activity and discussion among students than are required by more traditional activities (particularly of the "seat work" variety). In your effort to develop a supportive environment for creative learning, don't work against your own purposes by being too rigid about movement, activity, and noise. There is an important difference, which you can soon learn to distinguish, between disruptive behavior and the "productive noise" and activity of children busily involved in tracking down new ideas and solutions to problems.

A stimulating classroom is filled with resources. There are

things to explore, read, study and examine. There are many things on bulletin boards. There are places to relax and talk. The teacher encourages children to talk, to move about, to share ideas. The children do not drift aimlessly. There is no chaos. There is much active pursuit of learning activities. But the atmosphere is relaxed and pleasant. In such a room creativity and problem solving can flourish.

Deferred judgment

In Chapter 4, in relation to brainstorming, you read about the principle of "deferred judgment." This is also an important principle for the teacher to remember in working to establish a creative learning environment.

Premature and hasty teacher evaluation can destroy a child's first efforts at creativity or problem solving. Creativity and problem solving are risky ventures. There are many blind alleys, false starts, failures and frustrations. But children must learn to take the risks. This means that teachers must be slow to criticize. They should offer guidance and direction and praise for any successes. They should also help students to learn and practice the deferred judgment principle among themselves and avoid harsh criticism of each other's efforts. Children should also be encouraged to evaluate their own work, and given opportunities to learn how to do it, rather than being totally dependent on the teacher for evaluation.

Learning a facilitative role

When teachers first begin to consider the effects of increased student participation in planning, greater student independence in learning activities, and application of the principle of de-

ferred judgement, it is easy for some misunderstandings to occur. Quite frequently, for example, an atmosphere for creative learning is confused with a totally "unstructured" or permissive atmosphere. It is best to avoid the term permissive, for it is extremely value-laden and open to too many interpretations. Creative learning does place a great emphasis upon the active role of the learner in managing and directing learning activities independently. In many of the arrangements you develop to foster creativity, children will be somewhat noisier and more active physically than in traditional, self-contained, teacher-centered classrooms. But that does not mean that creative learning leads to children running around, screaming, shouting, or swinging from the light fixtures. Nor does it imply that learning is overlooked. In fact, it is true that children involved in creative activities will not only be working toward important goals and objectives, but will be less likely to resort to aggressive and disruptive behavior.

Of course, the teacher must maintain some control over the class, but a low authority profile will have the most beneficial results. The teacher must act as a guide or facilitator when using creative methods. This means that the methods are student-centered and not teacher-centered. While relaxing control may be difficult, it is usually an essential ingredient in getting children to think for themselves. At first, the students may not be productive, but with encouragement, patience, and support they will make gains.

If the students feel they can rely on your constant support and encouragement they will not be frightened or anxious to give

a response that may not be a popular one. When students are able to give responses that are unpopular and infrequently given by other students, or even funny or ridiculous, they are more likely to think creatively. It is the teacher's responsibility to be accepting of the student's responses, to provide encouragement and reinforcement for all ideas, and to reduce or eliminate the criticism of the other class members. In fact it is better to allow the humor and fun to flow, since this usually accompanies creative ideas. You can help the class most by laughing along with them. This will serve to reinforce the students for their original and flexible thinking and show that you are really serious about encouraging creative thinking.

The teacher must be very open and receptive to the ideas of all students. The teacher should not show strong approval of some children's productions while showing disapproval of others that seem silly, funny or unusual. Both quantity and quality of output will increase when evaluation is eliminated or at least postponed. This contributes to the supportive atmosphere that the teacher should try to foster, and reduces the fear and anxiety that reduces creative thinking and problem solving in young children. The children must also learn to express appreciation or enjoyment of each others' work while avoiding criticism, ridicule or sarcasm. The general classroom atmosphere should foster cooperative effort while allowing each child to think independently. The student must feel free to take risks in front of the other students and the teacher, and to express unusual, unique, or different ideas, without fear of ridicule. If students

are embarrassed or punished for what they say or do, it is not likely that they will make future attempts at thinking and presenting their ideas to classmates.

Finally, when you are attempting to establish a favorable atmosphere for creative thinking and problem-solving, you must learn to develop a great deal of patience. You must be able to restrain yourself from "squelching" the child who is a constant source of new ideas. But, by the same token, you must also learn not to inhibit the efforts of students who are slower in getting started. They should also have encouragement, support, and adequate time for thinking about a problem.

In learning a facilitative role, then, it is suggested that you must (1) emphasize the student's self-directed learning as much as possible; (2) maintain a low authority profile; (3) accept ideas, whether common or unusual, from all students; (4) foster in your students and in your own behavior a sense of constructive criticism and an emphasis on self-evaluation processes; (5) strive to eliminate punishment or ridicule of new and unusual ideas; and (6) tolerate differences of time or speed among students in the ability to think up new ideas.

5. Utilize learning procedures involving many activities and products.

After your efforts in planning many and varied activities and procedures to help students engage in creative thinking and problem solving, and in developing a facilitative atmosphere, there comes the time when teaching actually starts. Now your challenge is to work with your pupils in ways that will promote the successful attainment of your goals. You will have to work quite regularly

at maintaining the classroom environment and helping students employ many different abilities and skills in learning. While this may be a challenge, especially in working with children who have never encountered such efforts before, it is usually very exciting and satisfying for teachers and pupils alike.

There are some things you must be careful to remember, however. First of all, strive to find new and diverse ways for students to express themselves and demonstrate what they are learning. Too often it is easy to restrict ourselves to tests and written reports, although there are many other things pupils can do. You may plan specific alternatives, or allow the students to participate in designing them. Some other products to consider using in your class include: songs and music; murals, sculptures, or paintings; movement and physical expressions; community or school service projects; creation and production of original poetry and drama. You will find it valuable to encourage students to try their hand at expressing themselves in many different ways during a school year.

Creativity and problem solving projects can easily be integrated into the daily classroom routine either as a part of a particular subject area or independently. Many teachers set aside some special time during each day for students to work on their projects as a class, in small groups, or as individuals. If a special time is set aside, you may find it easier to establish a creative atmosphere in the classroom during that period. However, creativity and problem solving instructional materials can usually fit into any subject area that would normally be taught during the day. Many of the materials and methods described in

Chapter Three were specifically designed to be used as a part of the regular curriculum. Thus the Purdue Creative Thinking Program was designed to be used in social studies. Many of the materials are designed for use in language arts and some for use in mathematics and science. When used in this way the materials have dual benefits in that they not only aid in the development of some specific skill or knowledge but they also help to develop creativity or problem solving in students.

The use of small groups gives you and the students many advantages for creative thinking and problem solving activities. It reduces the fear and anxiety that may be associated with speaking in front of the whole class. Students are more likely to offer contributions when they are in a small, personal, closely seated group of people. Furthermore, the reduced number of students allows more time for each of the students to be presenting ideas, since each person in the group can talk more often than when the whole class is together. This may be especially helpful for students who speak infrequently or not at all. Small groups also allow students to proceed independently without supervision since the teacher can only visit with one group at a time. Small groups can also work at their own pace, going as slow or as fast as is appropriate for the group members.

You should also employ a variety of instructional techniques. Many teachers are already using large and small group discussion, some creative thinking techniques (such as brainstorming), a wide variety of films and other media, and individualized instructional

efforts such as learning centers or learning stations. These can all contribute effectively to creative thinking, problem solving, and inquiry by students. You may find it particularly useful, however, to use a contract or learning agreement approach to help students learn to use many instructional resources efficiently on their own.

6. Conduct a careful review and evaluation, not only of the students' learning, but of your own project and efforts, and plan-revisions accordingly.

Your first concern in evaluation will probably be to seek effective ways of assessing the students' performance, and it is certainly necessary to do this. Creative learning does not imply that any concern for evaluation is dismissed. Although it is important to learn to defer judgment, there must come a time when you get down to the process of making decisions and assessing the quality of ideas and solutions. In relation to evaluation of the students, there are three specific suggestions you should consider. First, learn to define and use new sources of "evidence" in your evaluation. Do not feel constrained to evaluation using paper and pencil test scores and reports. By adopting a broad definition of evaluation, the questions you are striving to answer are: "Has the student reached the goal? How well has the job been done? What kinds of data do I have to support the decision?" Be alert, therefore, for any kinds of data to document the attainment of the goals and objectives by the students. Second, learn to use criterion-referenced evaluation, not just norm-referenced. It is not always necessary to compare students with each other. In creative learning outcomes, it may frequently be much more appropriate to assess the

change or progress made by the learner from one time to another, or to examine the success of the learner's efforts in relation to the specific goals that were defined. Third, the evaluation of creative learning and problem solving should increasingly be conducted by the learner.

You should also be concerned with evaluating your entire project. You may find it valuable to do this on a day-to-day basis and not just at the completion of the entire project. Again, you should begin by going back to the general goals of the project: why did you begin the project initially? what were you hoping to accomplish? Then, for each of your responses to these questions, ask yourself, "What kind of evidence would indicate whether or not that has actually happened?"

An important aspect of evaluation, which you should also remember, is that one purpose of evaluation is to provide you with a basis for systematic revision of the program. Thus, after you have collected the evidence to evaluate your project, don't just use it to say, "It worked," or "It didn't work very well," and then drop it at that. Instead, seek to probe the strengths and weaknesses of the program, and try to look specifically at each factor thus identified. How can you improve the strengths? What can be done to revise the weaknesses? What new ideas should be incorporated?

Some Things To Watch Out For

No matter how careful your planning and attention to the basic guidelines, things can go wrong. You cannot be protected from those problems and aggravations that can accompany any approach to instruction. But there are some things that you

should be warned about, in the hope that forewarned will be forearmed.

First of all, don't give up when your first efforts are rough around the edges. Give yourself a fair chance to grow and to develop your own creative abilities. Too many times educational projects are dropped prematurely, with the first signs of difficulty, only later to have someone say, "Oh yes, I did try that once, and it wasn't any good." You must not be overcome with the frustration of a first attempt, but remember that with more experience, success will be easier to attain.

Second, creative thinking and problem solving, like any other educational concerns, can be handled in such a way as to become dull, boring routines. Your students will need variety, and there will be pressure upon you to create new ideas, and to keep on creating. Creative learning is not a venture for the teacher who wants to build a neat little package to use the same way, day in and day out. You will have to be prepared to work very hard to be flexible and original yourself.

Third, you will have to be flexible in responding to many more spontaneous, original ideas from your pupils. You won't have the cushion of the right answers in the teacher's guide to fall back upon. There will be times when you will have to say, "I don't know," and these occasions can be threatening to some people.

Fourth, you will have to deal with many more variations in time and daily schedules. Creative thinking and problem solving do take time. Individualized learning means that many children will be pursuing many different projects and activities through-

out the day. At first, this may seem to be a state of chaos or disarray, but as you become more confident of the learner's efforts and your own organization, it will become much easier for you to tolerate.

Fifth, you must be prepared to create and maintain a constantly changing and growing pool of resources for learning. It won't do to put the goblins and witches up on the bulletin board in October and leave them there until the turkeys go up at the end of November. Nor will the reading table be adequately stocked with a few old books to last the year. There must be many different resources, and you will have to work hard to see that they are up-to-date and well-suited to the changing interests and activities of the students.

Sixth, you may find that some of the traditional behaviors of teaching are difficult to change, particularly those which involve evaluation. When you look at someone's work, there may often be that persistent tendency to say, "Well, here's what you should do to correct this and that . . ." or "Let's see--this word is spelled wrong, and that idea isn't clear . . ." It is difficult to learn to defer judgment, even when you know that eventually, evaluation will still occur. This will be a challenge to your own creative ability.

Seventh, it may be difficult at first to keep in mind that every child has the potential for creative thinking and problem solving. One must be concerned not only with a few children who display exceptional creative talent, but with providing opportunities for every child to develop these abilities and skills.

Eighth, some creative thinking activities may be viewed by children as sex-typed. Creative dance, art, and poetry are viewed by some boys as girlish activities while mechanics, science, and sports are viewed by some girls as boy-type activities. Special efforts are needed by the teacher to overcome these sex-oriented responses. Above all, all creative and problem solving activities should be experienced by both boys and girls. If the experience is rewarding, most of the problems will be overcome or at least alleviated.

Ninth, creativity and problem solving methods and materials will demand a higher level of creative preparation from the teacher than traditional methods and materials. You will not be able simply to "follow the manual." More creative effort is needed to plan lessons, find materials, and guide ongoing learning activities.

Finally, you must make some decisions about your own values and commitments. You will be able to be most successful if you are concerned with fostering intellectual and personal growth in the individual child. You cannot view your job as mechanically "facing the little monsters every day" to get a paycheck if you are going to be successful in fostering creative learning, inquiry, and problem solving.

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